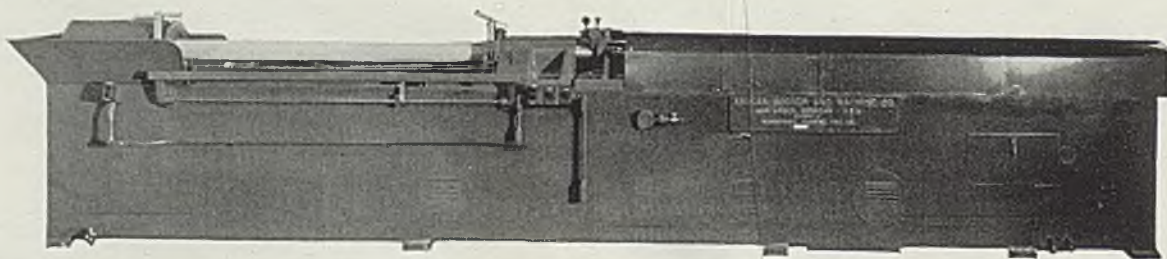
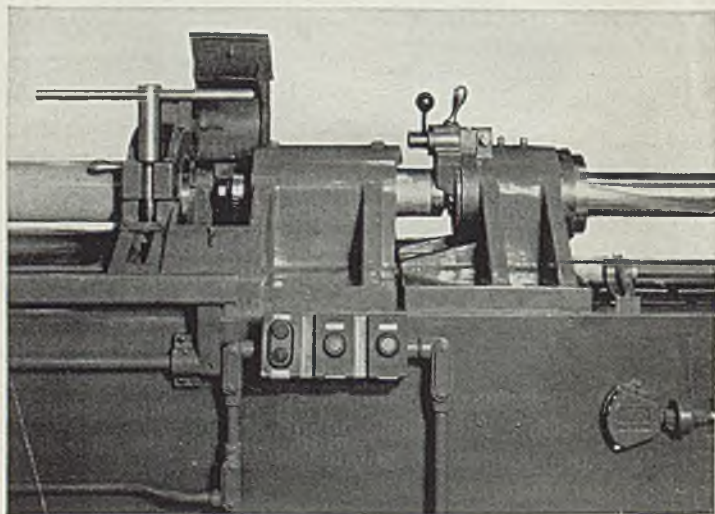


AMERICAN Speaks for DEFENSE



The AMERICAN Hydraulic Gun Rifling Machine is designed and built for broaching rifle grooves of constant helix in 105 MM Howitzer barrels. The method employed in producing the rifling grooves in gun barrels is to push a high speed steel hardened and ground cutter through the gun, driving the cutter in the proper helix angle in order to broach all the grooves together. Each cutter has an increased diameter over the previous cutter to facilitate taking a chip approximately .001 to .002. The cutter is mounted on the end of a long quill which guides in the bore of the gun barrel.

Photograph above shows the front view of the machine with all guards in place and sample tubing in position for rifling operation.



Photograph at lower left shows guard removed from lead bar and hinged guard is raised to illustrate the position of the cutter ready for entering the gun barrel. After the cutter has been mounted on the quill and locked in position, operator drops the guard and starts the machine through cut. At the end of the stroke, machine automatically stops and coolant shuts off. Operator lifts guard, removes cutter and returns machine back to original starting position. He then takes the next size cutter and repeats operation. Approximate broaching time after part is loaded and lined up is one and one-half hours per barrel.

AMERICAN BROACH & MACHINE COMPANY

ANN ARBOR, MICHIGAN, U. S. A.

BROACHING MACHINES, PRESSES, BROACHING TOOLS, SPECIAL MACHINERY



HIGHLIGHTING

THIS ISSUE OF

STEEL

■ LAST WEEK, with the tense labor situation moving more rapidly into the spotlight, there was much conjecture in industry as to just what might be expected to result from President Roosevelt's appointment of a National Defense Mediation Board intended (p. 26) to eliminate further delays in defense work due to strikes. The extent of the power lodged in the new board is to be revealed. Industry feels that it still remains to be seen whether industrial harmony will be sought by curbing labor organizers or by further smoothing their path. There is a question whether widespread, substantial wage increases will force prices to higher levels.

• • •

Steel output last week gained another point, rising (p. 27) to 99½ per cent of ingot capacity . . . Despite the high rate of production demand continues to increase (p. 93). Under this pressure, Inland Steel Co. (p. 33) declared an embargo against orders for 1942 shipments. In alloying and coating materials the situation grows more difficult. Chromium now is tight and may develop a pinch. Low-carbon ferromanganese is tense and even in the 80 per cent grade users are just about holding their own. Ferrosilicon is tightening. Vanadium is more critical because of a continued strike . . . A new OPM unit will be charged with finding substitutes (p. 22) for tight metals, also for reclamation of used metals.

• • •

OPM is tackling the problem (p. 22) of finding work for plants and workers normally engaged in making kitchenware and other aluminum products; OPM has a committee empowered to veto sites for defense plants . . . Sites have been selected in the Northwest (p. 22) for production of aluminum and ferrosilicon . . . Production must be increased 60 per cent to ful-

Against Lower Scrap Prices

fill requirements of the British aid bill and defense contracts still to be awarded (p. 31), says Mr. Knudsen . . . Defense vocational school training (p. 49) is ahead of schedule . . . Consumers object to Washington's demand (p. 93) for lower scrap prices . . . Additional materials and equipment have been added (p. 38) to the critical list.

• • •

Because of the critical situation in zinc the article by Wallace G. Imhoff (p. 56) entitled "How to Save Zinc in Hot Dip Galvanizing," is unusually significant at this time. Mr. Imhoff declares that correct galvanizing conditions result not only in highest quality product but in lowest possible manufacturing costs. . . . Bending presses are proving to be useful equipment (p. 87) for fast, economical straightening of armor plate that has warped in heat treatment. . . . A new ignitron tube for resistance-welder control (p. 80) utilizes a unique water-cooling system. . . . Newly developed (p. 68) is a removable, waterproof, sectional, steel roof for gondola cars.

• • •

In this week's installment in his series on the production of high-explosive shells, Prof. Arthur F. Macconochie (p. 58) discusses multiple-spindle automatic lathes and their tooling for machining shell forgings. . . . Raymond S. Osborne (p. 70) concludes his discussion of the cold riveting process. He points out the reasons for unsatisfactory results and presents details of recommended practice. . . . One of the common reasons for rejection of light-walled, hot-rolled tubing is the presence of ridges on the interior surface. Ross McLaren (p. 78) holds these defects do not occur on mills equipped with roller bearings. . . . F. C. Harris (p. 82) describes a newly developed overhead handling system.

Ridges Inside Light Tubing

"Call Ryerson"

To be Sure of Quality Steel ... and Fast Service, Too!

Ryerson service to American industry combines quick shipment from vast, conveniently-located stocks *and* quality certification under which every ton of steel in this huge reserve is carefully chosen to conform to definite quality standards.

Ryerson Alloy Steels are from selected heats that meet an ideal specification—a "specification within a specification"—and are delivered to you with complete heat-treating data. No time is lost testing in your plant; spoilage is eliminated; uniform response is assured. Yet, like all other Ryerson steels, Ryerson Certified Alloys cost no more.

With steel in brisk demand, you can have a dependable source of supply, and safeguard quality, too, by ordering from the nearest of the ten Ryerson plants. If the need is urgent, we suggest you not wait for quotations but mail, phone or wire an open order. Your steel will be shipped promptly and billed at standard prices. Stock List sent on request. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.



Conserving Vital Metals . . . Coming Transition in Materials, Men

Fifty to 80 per cent savings on nickel, aluminum and zinc effected by changes planned by Ford research engineers . . . Substituting steel and plastics

DETROIT

■ "CHANGES already mappel out in the making of automobile parts will mean 80 per cent saving in nickel, 50 per cent in aluminum, and 50 per cent in zinc," a Ford research expert stated last week.

"In some cases we already have made changes in materials. The new parts, far from being inferior to the old, in many instances are distinctly better. The appearance of some parts also has been improved, notably where plastics have been introduced to conserve metal."

No figures can be compiled on the anticipated total savings of vital materials, he pointed out but accurate estimates have been made regarding certain metals. In zinc, for example, the Ford saving would be approximately 600 tons yearly, based on estimated zinc consumption during the 1941 model year.

As fast as parts are changed the new are placed in a display alongside those they replaced. A partial list of the exhibits indicate the progress Ford engineers have made in conserving vital defense ma-

terials. It includes nickel and straight-chromium stainless steel instead of chrome-nickel on all bright metal trim; chrome-molybdenum steel instead of nickel steel for transmission and differential gears; heavier copper plate and higher polish on copper base for nickel plating, to reduce thickness of nickel necessary for protection and to avoid necessity for buffing nickel plate.

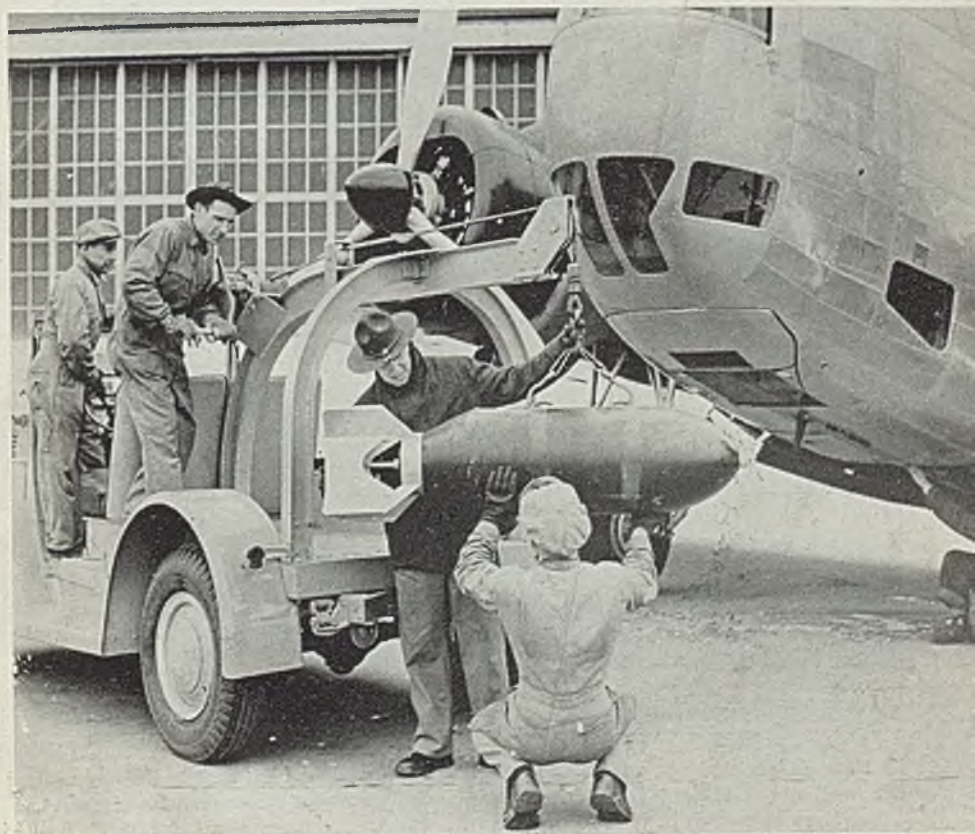
Aluminum—Eight of ten tractor parts now made of aluminum will be changed to iron or other ferrous material. Aluminum timing gear

replaced by steel and bakelite gear; aluminum cylinder heads replaced by cast iron head, found to be more efficient and corrosion resistant; die-cast, or powdered iron moldings, substituted for aluminum in brake wheel pistons; aluminum valve chamber cover replaced by cast iron; aluminum distributor body replaced by cast iron.

Zinc—Largest use of zinc on the Ford car is in die-cast trimmings, which are being replaced in part as rapidly as possible for exterior use by steel stampings; steering post hub and brackets from zinc

Ford Builds Bomb Trucks

■ New motorized equipment of U. S. Army Air Corps bases include Ford bomb service trucks, one unit of which is here being demonstrated at Stryder Field, Mich. The trucks are rigged with derrick and windlass to facilitate handling of bombs weighing from 600 to 1200 pounds. The bomb in the illustration is a 600-pounder. These trucks are used for towing bomb trailers or carry bombs from storage points to the airplane.



die castings to steel stampings or malleable castings; instrument panel grille requiring 2½ pounds of zinc to plastic panel; die-cast zinc horn button to plastic; interior metal trim replaced by plastic or bright finished steel; radiator shells from brass requiring 35 to 40 per cent zinc to copper; glass reflector for headlamp to replace silver-plated brass.

With metallic nickel now being rationed by the government because of defense requirements, Ford metallurgists made their largest reduction in this material, eliminating 75 per cent of the amount formerly used in various applications.

Magnesium, being released by the government only for defense purposes, is no longer used on any Ford commercial products, although several tractor parts were made of this light metal until recently.

Savings on other "critical" and "strategic" materials, according to Ford metallurgists, may include tin, tungsten and cork. Although no serious shortage now exists in any of these items, plans are being made for their future conservation.

For example, the design department has been urged to reduce body joints requiring solder tin; molybdenum alloys are being developed to replace tungsten for hard tips on tools; and a cardboard

substitute for cork is under consideration.

New Unit To Deal with Metal Substitutes and Reclamations

WASHINGTON

Application of metal substitutes in various industries and reclamation of used metals will be included in the duties of a new unit to be set up in the production division, Office of Production Management, it is learned.

R. E. McConnell, at one time president of the Centrifugal Pipe Co., Birmingham, will head the group, which will be known as the Conservation and Reclamation Unit.

A mining engineer who was called out of retirement by the OPM, McDonald was also director of the Rhokna Co., large carbon producer in Rhodesia, and president of Mayflower Associates, an investment company dealing with raw material deposits. He left the latter organization in 1936.

OPM Division To Handle Labor Dislocations Formed

A new unit will be established in OPM's labor division to handle the problem of unemployment caused by imposition of priorities in the aluminum fabricating and other industries. Diversion of aluminum to defense industries away from kitchenware, foil, machinery

parts and other civilian industries will cause several thousands of workers to lose their jobs, according to labor unions.

The new unit will attempt to find jobs for these workers or to keep the plants open by giving them contracts for defense materials.

International Council of Aluminum Workers told Sidney Hillman, associate director of OPM, that the problem was caused by giving orders to manufacturers whose present plants cannot handle their virgin reserves and depriving other plants of metal at the same time.

Reynolds Selects Washington Site for New Aluminum Plant

A 100-acre site at Longview, Wash. on the Columbia river has been chosen by the Reynolds Metals Co., Richmond, Va., for construction of an ingot aluminum plant where the company's virgin metal output will be brought to 100,000,000 pounds a year.

Building contract has been let to the Austin Co., Cleveland, and work in three ingot molding units is expected to begin immediately. The Longview plant, to be operated by power from the Bonneville-Grand Coulee dams, will produce 60,000,000 pounds of ingot annually, one-third more than the output from the new Reynolds ingot plant at Liser, Ala.

No "Business as Usual" Here



■ New defense plants are being erected with such speed that buildings are well along toward completion before excavation for floors has been started. Here is a case in point, inside the Ford aircraft engine plant in Detroit.

Electro Metallurgical Co. To Build Plant in Oregon

Electro Metallurgical Co., unit of the Union Carbide & Carbon Corp., New York, has acquired a site near Portland, Ore., and will start construction of a plant to manufacture calcium carbide and ferrosilicon.

As demand develops and as local supplies of chrome and manganese ores become available in commercial quantities, manganese and chrome-bearing alloys may also be produced.

Calcium carbide is used principally as the source of acetylene. It is also employed in the manufacture of synthetic organic chemicals.

Utility Adding Power at Vandergrift

■ The Engineering Co. is increasing its steel capacity at Vandergrift, Pa., with a long-fired open-hearth furnace. This is to meet demand for mill machinery. It is expected to be completed in 1941.

Payrolls \$438.6 Million, Net Income \$102.8, in U.S. Steel's Report for 1940

DEMANDS due to the war abroad and the rearmament program at home did not directly absorb the major portion of United States Steel Corp.'s 1940 steel output, declared Irving S. Olds, chairman, in his annual report last week to stockholders. He explained that such tonnage, however, with that indirectly required, added materially to the year's production.

He further pointed out that increasingly larger tonnages will be required, directly and indirectly, in connection with the war and national defense. As a consequence of extension of Axis control over most of Europe's steelmaking facilities, the United States is the principal source of steel for the import needs of that part of the world not under Axis domination, he stated.

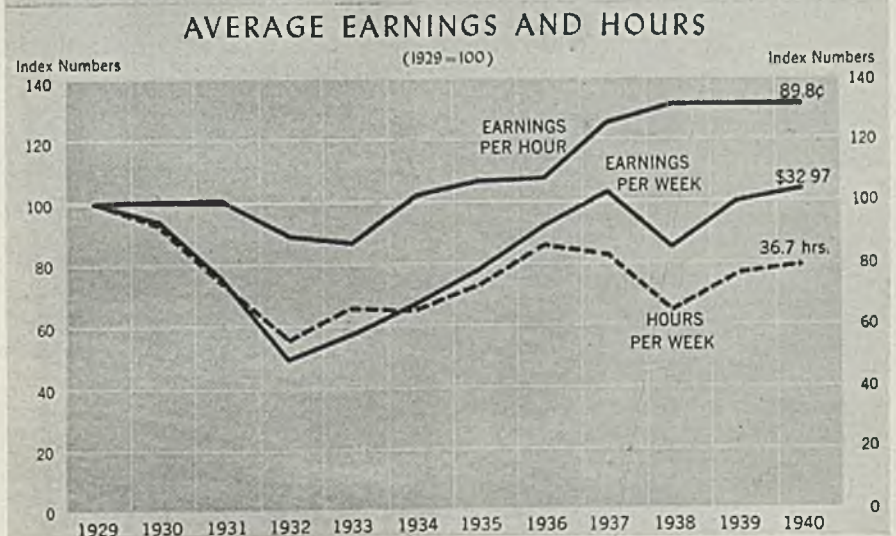
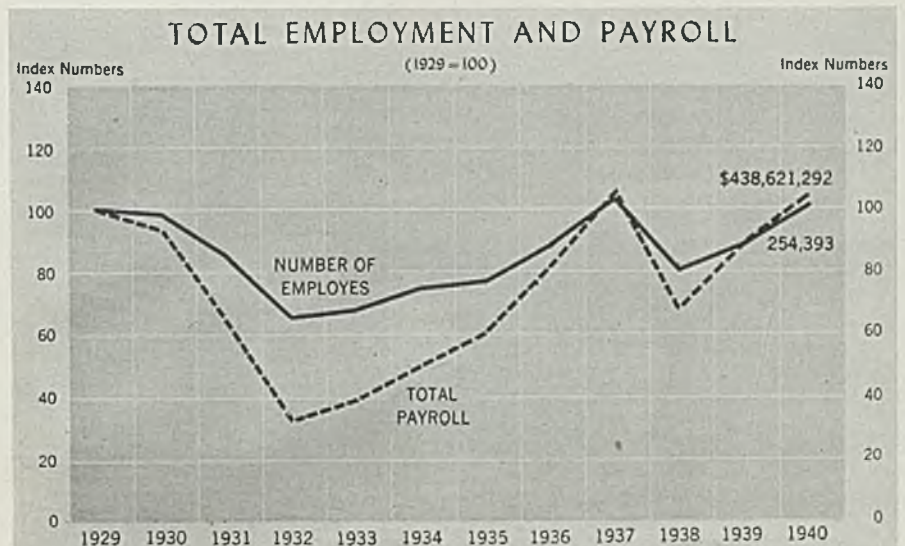
The Corporation's volume of business transacted last year totaled \$1,146,000,000, an increase of \$242,000,000 or 27 per cent over 1939. Approximate receipts for goods and services purchased by all customers, after deduction of inter-company revenues of transportation subsidiaries, were \$1,081,000,000 against \$857,100,000 in the previous year.

Finished steel shipments in 1940 totaled 15,013,749 net tons, 28.2 per cent more than 11,707,251 tons shipped in 1939, and largest for any year since 1929. Substantially below those at the end of last year, shipments at the beginning of 1940 declined further through April. Peak was reached in October. Total shipments to customers, by principal product groups:

Product Classification	Net Tons		Per Cent Increase
	1940	1939	
Rolled and finished steel	15,013,749	11,707,251	28.2
Pig iron, ingots, scrap, secondary products, etc.	1,540,504	1,038,761	48.3
Limestone, coal, ore, etc.	6,026,956	3,302,709	82.5
Cement (barrels)	13,415,019	12,603,302	6.4

Steel product exports constituted about 20 per cent of total tonnage sold. Exports increased relatively more than domestic sales. The Corporation's domestic business was about one-half the export volume. Shipments to Great Britain, the largest foreign market, were about one-quarter of total tonnage. Shipments to Latin America and Canada were about one-fifth of total tonnage. The remainder went to other foreign destinations.

Total capacity was increased by 25,000 net tons in 1940, to 29,720,000 net tons. This was largely through the addition of certain



Product Classification	Net Tons		Per Cent Increase
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Limestone, coal, ore, etc.	6,026,956	3,302,709	82.5
Cement (barrels)	13,415,019	12,603,302	6.4

ties, and additions resulting from new installations or from proven operating rates. Production of rolled and finished steel products last year averaged 80.2 per cent of capacity; in 1939 it was 77.7 per cent.

Gross expenditures for additions and betterments to the Corporation's facilities in 1940 were approximately \$72,000,000. Unexpended authorizations for such purposes at year's end totaled about \$134,000,000, with work in progress up-

on most of the projects, including further enlargement of ingot capacity.

Many of the expenditures and authorizations are for plant modernization, in fulfillment of which program the Corporation has expended more than \$700,000,000 since 1927. Substantial portion is for new facilities required for performance of contracts already undertaken under the defense program.

Steel ingot tonnage produced last year was largest since 1929. Total was 22,933,653 net tons, up 30.1 per cent from 17,625,676 net tons in 1939. Each of the principal products showed substantial increase

last year over that in 1939. Largest relative increase was in iron ore. Production comparisons:

Product Classification	Net Tons		Per Cent Increase
	1940	1939	
Iron ore	33,904,206	24,109,887	40.6
Manganese and zinc ores	142,354	115,010	23.8
Coal	29,527,686	21,623,834	36.6
Coke	16,143,957	12,091,676	33.5
Limestone, other raw materials	15,730,208	12,852,375	22.4
Pig iron, spiegel, and ferromanganese	18,366,576	13,655,719	34.5
Steel ingots	22,933,653	17,625,676	30.1
Rolled, finished steel for sale	15,543,856	11,996,811	29.6

Net income last year was \$102,211,282, compared with \$41,119,934 in 1939. Higher operating level was responsible for increased earnings. Dollar volume of sales approximated that in 1929, but earnings were considerably below the prior year. Increased taxes, wage and other costs more than offset savings resulting from plant modernization.

Earnings in 1940, after payment of the 7 per cent cumulative dividend on preferred stock, were equal to 7.5 per cent on the common stockholders' average equity. Latter is the sum of stated value of common stock, capital and earned surplus and insurance reserves. Average earnings on the Corporation's common stock for the five-year period 1936-40 were 3.1 per cent; for the ten-year period 1931-40, including deficit years of 1932-33-34-38, there were no earnings on common.

Four \$1 dividends on common were declared and paid in the year, with aggregate payments \$34,813,008. Regular quarterly dividends of \$1.75 per share on the preferred stock were likewise paid, total being \$25,219,677. Balance of \$42,178,597 was left after payment of dividends, compared with \$15,900,257 in 1939, when no dividends were declared on common.

"Reasonable" Returns Necessary

Referring to the Corporation's earnings record in the past decade, Mr. Olds said: "If the nation's productive mechanism is to continue effectively to function, the earnings of any basic industry over the years should be sufficient to pay a reasonable amount to the owners, to attract additional capital when required, and to permit retaining enough money to provide for technological progress and for future emergencies."

Corporation's total direct tax expenses in 1940 were about 27 per cent greater than in 1939. Aggregate last year was \$85,420,545, against \$67,017,086 in 1939. This was equal to \$335.78 per employee, \$5.69 per ton of finished steel shipped, \$7.90 per \$100 of public sales, or \$9.81 per common share.

Taxes over the past ten years totaled approximately \$514,000,000. Holders of common stock, in the same period, received about \$81,

000,000. This was less than 16 per cent of the amount paid to the government, and was equal to a

was slightly greater than in 1929. Employment data in each quarter and the full year, 1940:

Quarters	Av. No. Em- ployes	Total Payroll	Av. Hrs.		Earnings Per Wk.
			Per Wk.	Per Wk.	
First	244,031	\$ 99,135,515	35.0	89.4c	\$31.28
Second	240,257	100,736,396	35.9	89.7c	32.20
Third	261,197	115,749,282	37.4	90.2c	33.73
Fourth	272,087	123,000,099	38.1	89.9c	34.29
Year	254,393	\$438,621,292	36.7	89.8c	\$32.97

Participating employees last year contributed \$448,095 to the Corporation's pension fund, the employing companies, \$716,952. Pensions were granted 1472 employees who retired in 1940, and 13,876 were on the pension roll at the year's end. Pension statistics:

	1940	1939
Pensions Granted	1,472	1,457
Pensions Ceasing	893	885
Net Increase	579	572
Total Pensions in Force	13,876	13,297
Total Pensions Paid	\$8,710,130	\$8,683,393
	Employees Pensioned	
	1940	1939
Av. Age (yrs.)	63.4	61.6
Av. Length of Service (yrs.)	34.8	33.4
Av. Monthly Pension*	\$38.10	\$55.10

* (Adj. for public pension payments.)

How U. S. Steel Earned Its Living in 1940

	Amount (Millions)	Per Cent of Total	Amount Per Employee
Goods, services sold	\$1,081	100.0	\$4,249
This sum was disposed of as follows:			
Goods, services bought from others	370	34.2	1,454
Wear, usage of facilities (depletion, depreciation)	71	6.6	279
Taxes (local, state, social security, other federal)	85	7.9	336
Interest paid (for the use of savings of bond owners, etc.)	14	1.3	54
Leaving wages for workers and for use of facilities	341	50.0	2,126
These wages were disposed of as follows:			
Wages, salaries for workers	439	81.0	1,724
Wages for the use of facilities*	102	19.0	402
Wages for use of facilities were disposed of as follows:			
To holders of preferred stock	25	4.7	99
To holders of common stock	35	6.5	137
Retained for future needs	42	7.8	166

*These facilities wages were equal to 7.4% of the value of tools such as plants and other resources, which represent the savings of owners of preferred and common stock. These tools were needed for the production and sale of goods and services which enabled the payment of wages.

What the Corporation Paid in Taxes

	1940	1939	Per Cent Increase
State and local taxes	\$88,635,194	\$36,827,279	4.9
Social security taxes (state and federal)			
Unemployment compensation	12,480,250	10,888,231	14.6
Old age (including railroad) benefits	4,808,257	3,929,825	22.4
	17,288,507	14,818,056	16.7
Federal taxes (excluding social security)			
Capital stock, excise, miscellaneous taxes	3,196,844	2,396,751	33.4
Income taxes	26,300,000	12,975,000	102.7
	29,496,844	15,371,751	91.9
Grand total all direct taxes	\$85,420,545	\$67,017,086	27.5

Jobs, Hours, Payments to Workers, Government and Owners—1940 and 1929

Average number of workers employed in 1940	½% more than in 1929
Average weekly earnings per worker in 1940	4% more than in 1929
Average hours worked per week in 1940	21% less than in 1929
Government received in taxes in 1940	55% more than in 1929
Common stock owners received in dividends in 1940	45% less than in 1929



G. M. Harrison



Philip Murray



Clarence A. Dykstra, Chairman



Eugene Meyer



W. C. Teagle



George Meany



Thomas Kennedy



W. H. Davis



F. P. Graham



Cyrus Ching



R. D. Lapham

■ Above are members of the National Defense Mediation Board. Four at left represent labor; four at right represent industry; three in center, the public. NEA photos

Board Faces Over 30 Defense Strikes

■ ONTO THE LAPS of the 11 members of the National Defense Mediation Board, appointed last week by President Roosevelt, may be dumped one of the most troublesome assortments of labor disputes that has confronted this country in years. Whether the powers granted the new agency are adequate to cope with the situation remains an open question.

Board's direct powers are largely advisory. President's order establishing the board specified it should act whenever the Secretary of Labor certified that any controversy had arisen which threatened to "burden or obstruct" the production of essential defense equipment.

The body has authority to assist in negotiating settlements; it can provide means for voluntary arbitration; it can investigate management-labor disputes and make its findings public; it can ask the National Labor Relations Board to expedite determination of collective bargaining representatives.

Board does not have the power to step in and prevent a work stoppage or to force settlement of a strike.

Effectiveness may depend upon

Mediation agency has little direct power . . . Influence to depend largely on public opinion . . . First problem may be settlement of "strategic" stoppages . . . Knudsen still believes "cooling-off" period is necessary

its ability to direct the power of public opinion against those who obstruct defense production. To be most effective this must be supplemented by full support from defense and administration officials.

Personnel of the board includes three members representing the public, four representing labor, and four representing industry. They are:

PUBLIC: Clarence A. Dykstra, president, University of Wisconsin, and director of selective service, who will be the chairman; William Hammatt Davis, New York patent attorney; Frank P. Graham, presi-

dent, University of North Carolina.

LABOR: George Meany, New York, general secretary of the American Federation of Labor; George M. Harrison, Ohio, AFL vice president; Philip Murray, Pennsylvania, Congress of Industrial Organizations president and Steel Workers Organizing Committee chairman; Thomas Kennedy, Pennsylvania, secretary-treasurer of the United Mine Workers (CIO).

INDUSTRY: Walter C. Teagle, Connecticut, former president of Standard Oil Co. of New Jersey; Roger D. Lapham, California, president of the American-Hawaiian Steamship Co.; Eugene Meyer, publisher, *Washington (D. C.) Post*; Cyrus Ching, director of industrial and public relations, United States Rubber Co.

First meeting of the board will be March 25.

Accumulated during the past several months is a tangle of defense strikes, threatened strikes and other labor problems, which, for the safety of the defense program, demand early settlement. Strikes include:

Allis-Chalmers Mfg. Co., Milwaukee, affecting more than 7000 workers and tying up work on \$45,

000,000 in defense orders, since Jan. 22.

Harvill Aircraft Die Casting Corp., Los Angeles, which is holding up production of vital airplane parts and which threatens a major slowing down on aircraft production. It was charged in Congress last week that this stoppage was communist-inspired and was a deliberate attempt to "sabotage" the defense program.

Universal Cyclops Steel Corp., Bridgeville, Pa., which is relied upon for special steels for airplane parts. Vanadium Corp., New York, whose product is essential to tool-making companies.

Stoppages at more than 25 other plants engaged in national defense work. Many of these strikes are strategic in that they stop produc-

Strikes Since 1929

	Number	Workers Involved (Thousand)	Man Days Idle During Period (Thousand)
1929	921	289	5,352
1930	637	183	3,317
1931	810	342	6,893
1932	841	324	10,502
1933	1,695	1,618	16,872
1934	1,856	1,467	19,592
1935	2,014	1,117	15,456
1936	2,172	789	13,902
1937	4,740	1,861	28,425
1938	2,772	688	9,148
1939	2,613	1,171	17,812
1940	2,450	575	6,500
1941:			
January	220	65	625

Steel Employment Far Above 1929 Level

FULLY 19 per cent more employes were at work in the steel industry during 1940 than in 1929, according to the American Iron and Steel Institute, although the record-breaking tonnage of steel produced last year was only about 6 per cent above output in 1929, the previous peak year.

Among reasons why the increase in employment exceeded that of production were the shorter work-week, averaging 36.2 hours per wage earner in 1940 as against 55 hours in 1929, and the fact "steel products today are of such improved quality that in general they require more care and attention in production than those of a decade or so ago."

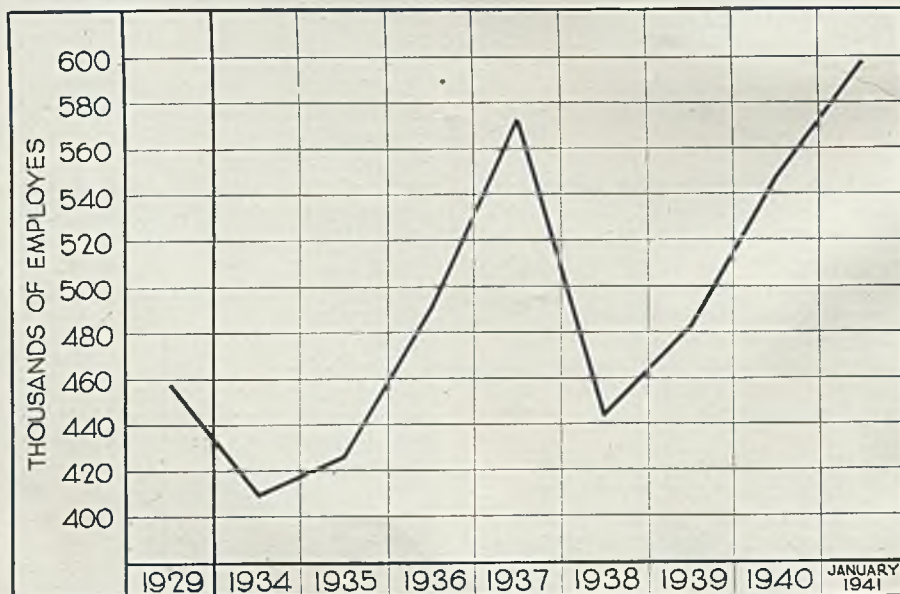
Payrolls in 1940 were 14 per cent more than in 1929, primarily reflecting the fact that hourly wages paid to steelworkers last year averaged 30 per cent above 1929.

During 1940, the industry gave employment to an average of 547,000 wage-earning and salaried workers, and distributed \$961,000,000 in payrolls.

In 1929, the number of employes averaged 458,000 for the year, and total payrolls amounted to \$841,000,000. Steel production in 1940 approximated 67,000,000 net tons, according to preliminary reports, compared with 63,000,000 net tons in 1929.

The peak of employment in 1940 came in the final quarter of the year when steel operations rose to an average of more than 95 per cent of capacity from the year's low point of 61 per cent during the month of April.

Below is charted total steel employment for selected recent years. United States Steel Corp.'s employment record is charted on page 23.



tion of vital parts and retard output in other plants where no labor dispute is in progress.

In addition to the strikes now in process the new board may soon be called upon to act in these problems:

SWOC's demand for a 10 cents an hour wage increase and other concessions from the United States Steel Corp. subsidiaries, now being negotiated. The settlement between U. S. Steel and the union is expected to set the pattern for SWOC's demands on other steel producers.

Representatives of the union and Carnegie-Illinois Steel Corp., largest U. S. Steel subsidiary, were holding formal conferences on the union's demands in Pittsburgh last week end. According to the provisions of the SWOCU. S. Steel contract, failure to reach an agreement before April 1 would result in termination of the contract. However, it has been suggested an extension might be arranged if no agreement is reached by that date. Conferences adjourned at 5 p. m. last Friday, to be resumed at 10 a. m. March 24.

UMW demand for a \$1 a day increase for soft coal miners.

CIO threats of strikes against Ford Motor Co., Bethlehem Steel Co., and other holders of large defense contracts from whom the CIO unions are seeking to gain recognition.

Lowering Plane Output

William S. Knudsen, director general of the Office of Production Management commented favorably on the new board. However, he reiterated his belief there should be a 30-day "cooling-off" period before strikes could be started.

Explaining that the labor situation was all right up to six weeks ago but that there have been too many strikes since, Mr. Knudsen said there should be no stoppage of defense work without a vote by the workers.

Merrill C. Meigs, in charge of aircraft for the OPM's production division, told the House Judiciary committee that strikes affecting the aircraft industry had forced officials to revise estimates of production downward.

Strikes on the West coast, he said, "will definitely hold up production of a major part of our planes."

Chief threat to the aircraft industry are "strategic" strikes as that at Harvill, which only about 20 men but which production of 200 die daily. A committee of 10 said that such strikes would be a major threat to the industry.

Canadian Steel Plant Planned for Vancouver

TORONTO, ONT.

■ Establishment of a steel plant, consisting of a melting furnace and small rolling mill at Vancouver, B. C., to utilize accumulated scrap, has been approved by C. D. Howe, minister of munitions and supply, and H. D. Scully, steel controller for Canada.

The project is being sponsored by Frank Wilkinson, Vancouver, associated with Morrison Steel & Wire Co. Ltd. and Pacific Bolt Mfg. Co. Ltd., both of Vancouver. Cost of the plant is estimated at about \$500,000. Such a plant would make available a supply of steel locally and enable manufacturers to broaden defense production now dependent on shipments from eastern Canada.

Munitions and supply department reported 1721 contracts awarded in the week ended March 7. Aggregate value was \$16,379,020. The orders:

Shipbuilding: Dufferin Shipbuilding Co., Toronto, \$1,290,557; Halifax Shipyards Ltd., Halifax, N. S., \$131,670.

Dockyard supplies: Canadian Car & Foundry Co. Ltd., Montreal, Que., \$8676.

Instruments: H. R. Bland, Montreal, \$7500; United States Gauge Co., Montreal, \$8071; Canadian General Electric Co. Ltd., Ottawa, Ont., \$248,968; Instruments Ltd., Ottawa, \$66,805; Ontario Hughes-Owens Co. Ltd., Ottawa, \$198,067; Stanley Mfg. Co. Ltd., Toronto, \$26,672; Surgical Supplies (Canada) Ltd., Toronto, \$5430.

Machinery: Plessisville Foundry Co., Plessisville, Que., \$5115; Mathews Conveyor Co. Ltd., Port Hope, Ont., \$6210; W. J. Knox Ltd., Toronto, \$9200.

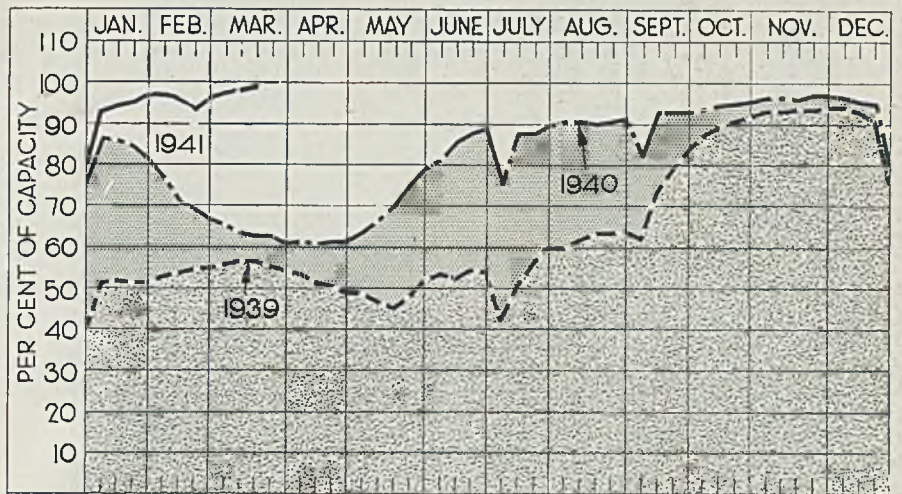
Land transport: Arlington Cycle & Sports Ltd., Montreal, \$10,419; George W. Reed Co. Ltd., Montreal, \$15,367; Denni-steel Corp., Ottawa, \$29,972; General Supply Co. of Canada Ltd., Ottawa, \$23,276; International Harvester Co. of Canada Ltd., Ottawa, \$19,763; Metallic Roofing Co. Ltd., Ottawa, \$29,802; Brantford Coach & Body Co. Ltd., Brantford, Ont., \$152,819; Eastern Steel Products Co. Ltd., Preston, Ont., \$57,914; Bickle Seagrave Ltd., Woodstock, Ont., \$6300; Canadian Top & Body Co. Ltd., Tilbury, Ont., \$63,945; Ford Motor Co. of Canada Ltd., Windsor, Ont., \$19,233; Gar Wood Industries of Canada Ltd., Windsor, \$7576.

Aircraft: British Air Ministry, England, \$35,400; Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., \$23,530; Fairchild Aircraft Ltd., Longueuil, \$7993; Canadian Vickers Ltd., Montreal, \$5344; Cordage Distributors Ltd., Toronto, \$12,517; H. Paulin & Co. Ltd., Toronto, \$6864; National Steel Car Corp. Ltd., Hamilton, Ont., \$9616; Dooon Twines Ltd., Hamilton, Ont., \$9048; Standard Machine Co. Ltd., Winnipeg, Man., \$46,008; Canada Cordage Co. Ltd., Vancouver, \$2,210.

Supplies: British War Office, England, \$162,200; Dominion Engineering Co. Ltd., Lachine, Que., \$2,049,600; Canada Cycle & Motor Co. Ltd., Weston, Ont., \$63,792.

Other: Eureka Planter Co. Ltd., Hamilton, Ont., \$25,637.

Expenditure: Canadian Acme Gear Ltd., Toronto, \$403,356; Dominion Engineering Co. Ltd., Toronto, \$1,000,000; Cavilland Aircraft Co. of Canada Ltd., \$136,231; Canadian West-ern Rubber Co. Ltd., Hamilton, \$3,270,417; Canadian Rubber Co. Ltd., Canada, \$30,100.



PRODUCTION Up

■ STEELWORKS operations last week advanced 1 point to 99½ per cent. Seven districts increased their rates, one declined and four were unchanged. A year ago the rate was 62½ per cent; two years ago 55½.

Youngstown, O.—Steady at 97 per cent, with 75 open hearths and three bessemer active. Sharon Steel Corp. suspended one open hearth for minor repair with only slight loss of tonnage. Schedule for this week is at the same rate.

Cincinnati—Gained 4½ points to 93½ per cent as one open hearth was returned to service.

St. Louis—Addition of two open hearths advanced production 6 points to 99 per cent, a new high for this district. Only one open hearth is inactive.

Birmingham, Ala.—Unchanged at 90 per cent, with 22 open hearths in production.

Cleveland—Removal of five obsolete open hearths from potential capacity caused the rate to rise 8 points to 98 per cent. These furnaces have not been active for some time and have been dismantled.

Central eastern seaboard—Held at 96 per cent, open hearth repair preventing a higher rate.

Buffalo—Increased 2½ points to 93 per cent as Republic Steel Corp.

lighted a repaired open hearth.

Detroit—Dropped 4 points to 89 per cent as three open hearths were down for repair during most of the week.

Chicago—Rose 2½ points to 101½ per cent, new all-time high, the previous peak being 100 per cent, reached three times since November. Five of six producers are at 100 per cent or higher.

Pittsburgh—Advanced 1 point to 101½ per cent, a new high for the district.

Wheeling—Continued at 88 per cent for the fifth consecutive week.

New England—Advance of 8 points to 100 per cent as furnaces were returned to production. A slightly lower rate is scheduled for this week as repairs will be necessary.

Two Months Ahead of Schedule on Army Order

■ Aetna-Standard Engineering Co., Youngstown, O., is nearly two months ahead of schedule in manufacturing antiaircraft gun carriages for the army, according to President Ernest Swartsweiler. Company has two contracts, totaling \$5,000,000. Deliveries were scheduled to begin in May.

The first completed gun carriage was unveiled March 22 in a ceremony at the company's Ellwood City, Pa., plant, attended by officials of the ordnance department.

■ British, allied and neutral ships sunk during the first 18 months of the war have totaled 4,962,257 tons, according to *Lloyd's List & Shipping Gazette*. This is 600,000 tons more than the similar losses in the first two and a half years of the World war.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended	Change	Same week	1940	1939
	Mar. 22		1940	1939	
Pittsburgh	101.5	+ 1	57.5	48	
Chicago	101.5	+ 2.5	59.5	56.5	
Eastern Pa.	96	None	60	40	
Youngstown	97	None	43	54	
Wheeling	88	None	73	63	
Cleveland	98	+ 8	74	52.5	
Buffalo	93	+ 2.5	51	37.5	
Birmingham	90	None	78	78	
New England	100	+ 8	65	65	
Cincinnati	93.5	+ 4.5	51	55	
St. Louis	99	+ 6	58	57.5	
Detroit	89	- 4	73	72	
Average	99.5	+ 1	62.5	55.5	

MEN of INDUSTRY

■ **DEAN ROLLANS** has been appointed general sales manager, Wickwire Spencer Steel Co. and its subsidiary, American Wire Fabrics Corp., New York. He succeeds A. G. Bussmann who has resigned because of ill health. Associated with Wickwire Spencer since 1928, Mr. Rollans spent the first two years in the mid-continent oil field. In 1933 he was promoted to general credit manager and assistant treasurer, and in the ensuing years extended his activities to many phases of the company's management.



Dean Rollans

◆ **Frederick A. Ohlmstead** has been appointed Cleveland district sales manager, Youngstown Sheet & Tube Co., Youngstown, O., with headquarters in the Terminal Tower.

◆ **Ralph K. Clifford**, vice president in charge of operations, Continental Steel Corp., Kokomo, Ind., has been elected a director.

◆ **Edwin S. Webster**, co-founder of Stone & Webster Inc., New York, has been elected chairman of the board. He succeeds the late **Charles A. Stone**. The office of vice chairman of the board, formerly held by Mr. Webster, has been eliminated.



F. A. Ohlmstead

◆ **Carlton B. Smith**, formerly district service engineer in the southeast district for Allis-Chalmers Mfg. Co., Milwaukee, has been promoted to district superintendent of service and erection, with headquarters in the Healey building, Atlanta, Ga.

◆ **C. F. Bennett** has been advanced from president to chairman of the board, Stanley Works, New Britain, Conn. **R. E. Pritchard** has been elected president, succeeding Mr. Bennett.



Henry Holdren

◆ **James T. Duffy**, president and general manager, Read Machinery Co., York, Pa., is president of the newly formed Colonial Casting Co., which will reopen about April 1 the former Susquehanna foundry on Hanover street, New Oxford, Pa. **Harry B. Allison** is manager of the new company. New equipment will be installed on completion of alterations and repairs.

◆ **Henry Holdren**, general traffic manager, Pittsburgh-Des Moines Steel Co., Pittsburgh, was honored at a party given by his associates March 21 on his completion of 40

years in the traffic business. He is chairman of the joint traffic conference of independent steel fabricators, and is also serving on the

Allegheny Regional Advisory board, Association of American Railroads. He has served as president, Traffic & Transportation Association of Pittsburgh and as a member of the board of governors, Traffic Club of Pittsburgh.

◆ **Ray P. Farrington** has resigned as trustee and vice president in charge of sales, Alloys Plating Laboratories, Pittsburgh, and is now associated with the Army Ordnance department as chief inspector, Philadelphia Ordnance district, Philadelphia.

◆ **Dr. Armand Di Giulio**, until recently research metallurgist with Ford Motor Co., Dearborn, Mich., is now associated with the research laboratory of Bundy Tubing Co., Detroit, as special assistant to **Dr. R. H. Hobrock**, vice president in charge of research and production. Dr. Di Giulio is a graduate of the University of Michigan.

◆ **Paul B. Morgan**, associated with Morgan Construction Co., Worcester, Mass., 50 years, the past 30 as president, has been elected chairman of the board. He has been succeeded as president by **Philip M. Morgan**, treasurer since 1927. **J. W. Sheperdson**, vice president since 1929, has become executive vice president. **James A. Buell**, chief engineer, and **Myles Morgan**, assistant chief engineer, have been made vice presidents.

◆ **Paul B. Morgan Jr.**, since 1931 assistant treasurer, has been elected treasurer, and **Weld Morgan**, engineer in the wire machinery department, has been added to the board of directors to succeed his father, the late **Ralph L. Morgan**.

The board includes the son and four grandsons of the late **Charles Hill Morgan**, founder of the company.

◆ **Paul M. Hocven Jr.** has been named eastern field supervisor, and **Dorcey F. Hines**, western field supervisor of General Electric Co.'s air conditioning and commercial refrigeration department, Bloomfield, N. J. Both will report to **E. B. McClelland**, assistant sales manager in charge of field operations. Mr. Hocven's headquarters will be in Cleveland, while Mr. Hines will have headquarters in Kansas City.

◆ **Daniel Peterkin Jr.**, vice president, Morton Salt Co., Chicago, has been elected president to succeed his father, the late **Daniel Peterkin Sr.** **B. W. Carrington**, senior vice presi-

dent, has been made chairman of the board, and **J. A. Clements**, vice president, has become executive vice president.

Frank J. Staral, formerly with the Cleveland office of Steel & Tubes division of Republic Steel Corp., has been appointed sales representative for Park Chemical Co., Detroit, covering Indiana and Kentucky, with offices at 1301 North Emerson avenue, Indianapolis.

John P. Clark, for five years associated with Minneapolis-Honeywell Regulator Co. in Cleveland, is now Park Chemical representative in Philadelphia, with offices at Sixty-eighth avenue and Thirteenth street.

DIED:

■ **Gifford K. Simonds**, 60, president and general manager, Simonds Saw & Steel Co., Fitchburg, Mass., March 20, at Brookline, Mass. He had been associated with the Simonds company since 1898.

■ **Harry L. Gilbert**, 88, in charge of heat treating, Great Lake Forge Co., Chicago, until his retirement in 1928, at his home in that city, March 17.

■ **Seymour N. Sears**, 63, vice president, Tucker Co. Inc., mechanical tool manufacturer, New York, March 19, at his winter home in Miami, Fla.

■ **William T. Dennison**, 50, an executive in the railroad sales department, Edward G. Budd Mfg. Co., Philadelphia, March 16, at his home in Narberth, Pa.

■ **Roy L. Stofer**, secretary and sales manager, Patterson-Leitch Co., Cleveland, in Tucson, Ariz., March 18. He had been associated with the company since 1921.

■ **Henderson Montgomery Green**, 67, first vice president, Raybestos Manhattan Inc., New York, at his home in Montclair, N. J., March 10.

■ **A. J. Lindemann**, a director and former president and chairman of the board, A. J. Lindemann & Hoverson Co., Milwaukee, in that city, March 12.

■ **Capt. Fred A. Bailey**, 73, veteran lake captain, March 18, at his home in Lakewood, O. He had spent 50 years on the Great Lakes until his retirement four years ago, and at one time was fleet captain for the Pittsburgh Steamship Co.

■ **Monroe H. Hanauer**, 55, for many years Pacific coast manager for Minneapolis-Moline Power Implement Co., Minneapolis, in Los Angeles, recently.



■ **DAY IN, DAY OUT:** Continuously, steelworks now operate to meet defense and civilian needs. South Works, Chicago, Carnegie-Illinois Steel Corp.

Demand Little Affected by Lease-Lend

NEW YORK

■ **WHILE** heavy British inquiry was expected after the lease-lend bill was signed, this has not developed, and some leading exporters declare now that they do not see such action soon, at least in steel products. Delay may be due to several factors, including methods of financing and clarification of ocean transportation problems. Great Britain has placed little new business in this country since the lease-lend bill was first proposed late last year.

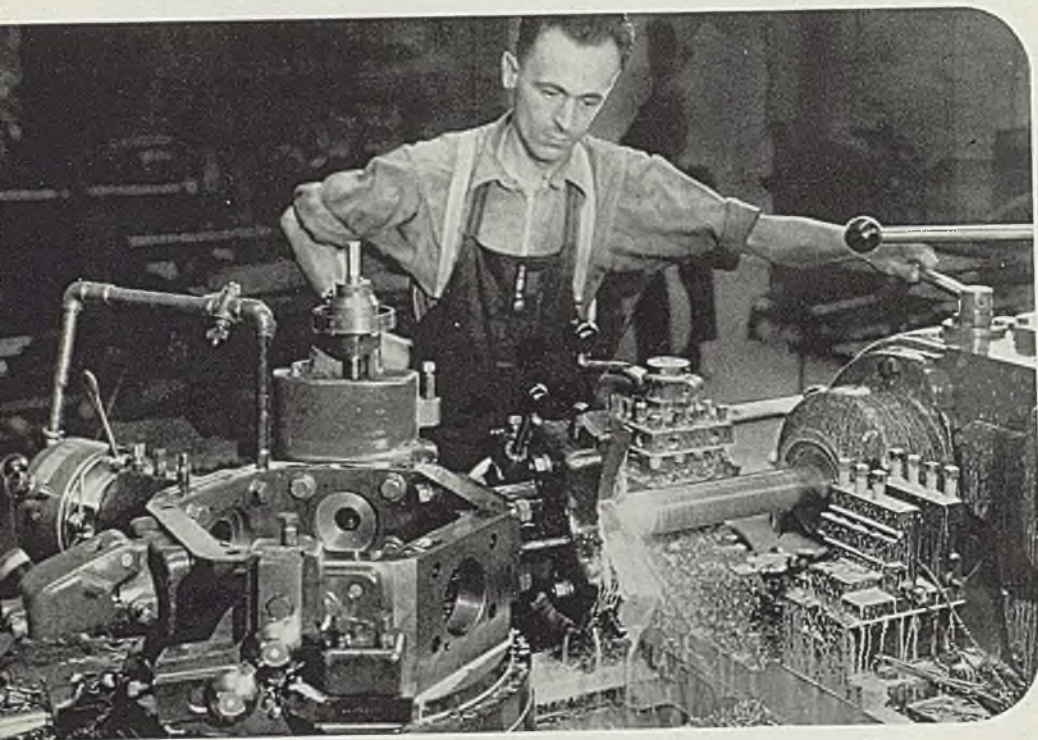
At present the only exception to this situation is a flurry in tin plate inquiry, mainly tonnage for British colonies, such as Australia, India and those in South Africa. Some of the inquiry is coming through the British Purchasing Commission here, and some direct from the colonies. This is said to reflect curtailment in British tin plate production.

Demand from neutral countries,

especially those in South America, is brisk but actual buying is rather limited. In many cases purchases are restricted by amounts exporters have to sell. Further, the extended deliveries generally quoted, and to some extent the export licensing system, also are limiting factors.

■ Organization of an advisory committee of leading steel executives to co-operate with the government in the defense program is expected to be announced soon. B. F. Fairless, president, United States Steel Corp., will be chairman, it is understood. A special steering committee will include: E. G. Grace, president, Bethlehem Steel Co.; T. M. Girdler, chairman, Republic Steel Corp.; E. T. Weir, chairman, National Steel Corp.; and E. L. Ryerson, chairman, Inland Steel Co. Membership will be made up largely of directors of the American Iron and Steel Institute.

HEMISPHERE DEFENSE



*begins
here!*

IT begins at once with machines that must provide weapons for our armed defense. It can only continue in the future with machines that can manufacture products that command wide markets and permit Americans to continue earning adequate wages. Special machines built for defense work can only be junked, or written off, when the present emergency is over. Versatile, adaptable, standard Jones & Lamson equipment will meet many of your present requirements *to the utmost advantage* and still be available for retooling to earn welcome profits in the years to come. That's why it pays both ways to put your production problems up to Jones & Lamson engineers.

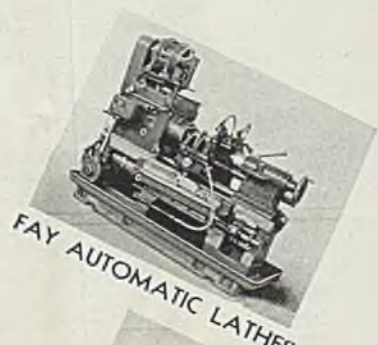
PROFIT PRODUCING



MACHINE TOOLS

JONES & LAMSON MACHINE CO.
SPRINGFIELD, VERMONT, U. S. A.

MANUFACTURERS OF SADDLE & RAM TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . . AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES . . . AUTOMATIC THREAD GRINDING MACHINES . . . COMPARATORS . . . TANGENT AND RADIAL, STATIONARY AND REVOLVING DIES AND CHASERS



FAY AUTOMATIC LATHES



AUTOMATIC THREAD GRINDERS



OPTICAL COMPARATORS



AUTOMATIC DIE HEADS

Windows of WASHINGTON



By L. M. LAMM

Washington Editor, STEEL

Sixty per cent increase in production needed to fulfill requirements of British aid bill . . . OPM group empowered to veto defense plant site selections . . . Seaway controversy revived . . . Government arranging to buy five munitions plants . . . Regulations governing reports on machine tools revised . . . Parts for merchant ships to be fabricated inland

WASHINGTON

AMERICA'S production must be increased 60 per cent to fulfill requirements of the British aid bill and defense contracts yet to be awarded, William S. Knudsen, director general, Office of Production Management, told a conference of 75 plant management representatives and labor leaders in Washington last week.

Mr. Knudsen stressed the need for training more skilled workmen in the vital metal trades industries. To forestall an actual shortage of capable workmen, management and union representatives were asked to bring forward specific proposals for accelerating training programs.

"We've got to go into production on a scale that in America has never been approached before," the OPM director declared.

Mr. Knudsen asked primary contractors to sublet every bit of work possible and advised small manufacturers to apply for defense work through the regional offices of the OPM.

Conferees included: M. M. Anderson, Alraymin Co. of America, Pittsburgh; J. R. Berg, Mesta Machine Co., Pittsburgh; E. C. Bullard, Pullard Co., Bridgeport, Conn.; C. J. C. Yale & Towne Mfg. Co., Philadelphia; William Conover, Conover Steel Corp.; R. C. Crawford, Crawford Steel Corp., Virginia; C. Crawford, Crawford Steel Corp., Cleveland; A. J. Timmer, Timmer Roller Bearing Co., T. Fisk, Fisk & Ma-

M. Gillies, Inland Steel Co., Chicago; W. G. Golden, Reynolds Metals Co., Richmond, Va.; E. J. Hanley, Allegheny Ludlum Steel Corp., Pittsburgh; Roy Hunt, Aluminum Co. of America, Pittsburgh; J. L. Perry, Carnegie-Illinois Steel Corp., Pittsburgh; Warner Seeley, Warner & Swasey Co., Cleveland; Harry Scullin, Scullin Steel Co., St. Louis; D. W. Sieman and C. E. Tuttle, Rustless Iron & Steel Corp., Baltimore; Lauson Stone, Jones & Laughlin Steel Corp., Pittsburgh; Richmond Viall, Brown & Sharpe Mfg. Co., Providence, R. I.

Defense Program Progress Reviewed by OPM Director

Mr. Knudsen also announced that the total value of major defense contracts awarded by the War and Navy Departments from June 1, 1940, through Jan. 31, 1941, was \$12,575,869,000.

Since that time, the United States and British governments, either directly or through tax depreciation provisions, have been instrumental in plant expansions involving 784 plants having an estimated total cost of \$2,138,000,000. Of these, the United States government, through the War and Navy Departments, the Reconstruction Finance Corp., and the Defense Plant Corp., have awarded contracts or issued letters of intent for the construction or expansion of 302 plants at an estimated cost of \$1,574,000,000 up to March 1. The British government has financed expansion of 61 plants in the amount of \$171,000,000. Cer-

tificates of necessity, which entitle owners of plant facilities to an accelerated rate of depreciation for tax purposes on plants required for the national defense program, have been approved for the expansion of 421 plants at an estimated cost of \$393,000,000.

Between May, 1940, and January, 1941, there was an increase of 1,445,000 persons working in non-agricultural industries. The increase from January, 1940, to January, 1941, was 1,868,000 employes. In manufacturing industries alone there has been an increase of 968,000 persons from May to January. Most of this increase has been in the durable goods industries in which employment has increased by 721,000 persons, or 19 per cent.

Speaking of the prospects for early production of defense equipment, Mr. Knudsen declared "things will begin to roll" within the next three or four months. He pointed out, however, that progress in the production of different types of equipment varies according to decisions reached as to the type of equipment on which greatest effort should be concentrated.

A priority rating given to a certain item, Mr. Knudsen explained, is carried through to the various pieces of equipment. For instance, delivery of guns and instruments for airplanes must be made in time to meet production schedules for the completed planes. Also, in the case of ships, the production of propulsion machinery and auxiliaries must be timed with the construction of the completed vessel.

OPM Committee To Rule on Sites for Defense Plants

Office of Production Management has appointed a committee empowered to veto sites for defense plants selected by the Army and Navy. Action was taken to meet charges that arms plants are concentrated in a few, favored sections of the country.

Committee includes Donald M.

Nelson, OPM purchasing director; Clifford Townsend, agricultural and labor advisor; Eli Oliver, labor relations assistant; E. F. Johnson, chief of the airplanes, tools and ordnance division; and S. R. Fuller, chairman of the production planning board.

Seaway Project Agreement Reopens Old Controversy

The old controversy concerning the St. Lawrence seaway and power project was revived last week after the United States and Canada signed an agreement to start the project as a joint defense measure.

The agreement is subject to approval by Congress and the Canadian parliament, but requires only a majority vote in each house. Current agreement differs from the treaty proposing a similar project which in 1934 failed to receive the required two-thirds vote in the United States Senate.

Strong opposition to the proposal appears certain to develop in Congress. Senator Alva Adams, Colorado, last week said: "I can't see the national defense end of this agreement at all. Any project that takes four or five years to complete can't have much bearing on immediate defense needs."

Cost of the project has been estimated by engineers at \$266,170,000, most or all of which would be paid by the United States.

Steel Parts for 260 Merchant Ships To Be Fabricated Inland

Steel parts for 260 merchant marine ships to be constructed for the United States and Great Britain will be manufactured inland "as far as possible" and welded in seven shipyards to be established on the coast, Mr. Knudsen said last week.

An additional shipbuilding program probably will get under way after the 260 vessels are built, he added, but funds have not yet been appropriated by Congress.

Used Machine Tools To Be Listed by Defense Officials

Complete catalog of all used machine tools which are for sale anywhere in the United States will be compiled as a result of changes in the method by which tool dealers report their sales, purchases and inventories under the second-hand machine tool price schedule, Leon Henderson, commissioner of price stabilization, National Defense Advisory Commission, has announced.

Defense contractors who need machine tools will be able to inspect this catalog in the machine tool section of the production division, OPM, and will have the help of officials of that division

in getting in contact with dealers who have the tools they need.

To make this possible, that section of the used machine tool price schedule which relates to the filing of reports by dealers has been simplified, Mr. Henderson said. The change was explained to representative leaders in the industry at a conference in Washington last week with officials of the price stabilization division and the production division.

Previously, dealers were required to render complete weekly inventory and monthly sales reports to the price stabilization division. Now the dealer need report each tool in his possession only once—either now, as part of his inventory, or when he buys it. If he sells it, the sale also must be reported.

There will be a separate report on each tool, and this will give a full description of the tool, including its price.

Office for Emergency Management Organized

Office for Emergency Management through Liaison Officer William H. McReynolds last week announced:

"On Feb. 28, 1941, the President reallocated to the Office for Emergency Management the funds already made available to the Advisory Commission to the Council of National Defense. These funds are to be used for administrative and operating expenses of the Office for Emergency Management and such agencies as are established in or co-ordinated through it.

"Pursuant to the terms of the President's letter to me on the same date, I have established in the Office for Emergency Management a division of central administrative services and a division of information.

"The division of central administrative services will be directed by Sidney Sherwood under my supervision. In accordance with the authority granted by the President, this division shall maintain a central budgeting, accounting, and fiscal control system for the Office for Emergency Management and its constituent agencies; and shall make provision for such personnel and general office services as are necessary or desirable to facilitate the efficient operation of the several agencies of the Office for Emergency Management. The administrative personnel of the division is as follows:

"Sidney Sherwood, director; Shane MacCarthy, executive assistant to Mr. Sherwood; Jerome Gunther, budget and finance officer; Charles Mills, personnel officer; and William D. Wright, chief of service operations.

"In continuing to serve the advisory commission and other de-

fense agencies, the division of information in the Office for Emergency Management will be directed by Robert W. Horton, under my supervision, and shall provide central informational services to the several offices and divisions in the Office for Emergency Management.

"In accordance with executive orders of Jan. 7 and 11, 1941, and the administrative order, dated Jan. 7, 1941, the following agencies are established in or co-ordinated through the Office for Emergency Management:

"Office of Production Management; division of labor of the advisory commission; division of agriculture of the advisory commission; division of price stabilization of the advisory commission; division of transportation of the advisory commission; division of consumer protection of the advisory commission; division of defense housing co-ordination; division of state and local co-operation; office for co-ordination of commercial and cultural relations between the American republics; national defense research committee; and defense communications board."

Defense Plant Corp. To Buy Five Munitions Factories

Defense Plant Corp., a subsidiary of the Reconstruction Finance Corp., at the request of the War Department and with the approval of the President, is arranging to buy several munitions plants, the construction of which has been financed by the British Government. These include a powder plant near Memphis, Tenn., which has been constructed for the British at a total cost of approximately \$25,000,000, and four machine gun plants, aggregating approximately \$21,000,000, as follows: Buffalo Arms Corp., Buffalo; Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.; Kelsey-Hayes Wheel Co., Plymouth, Mich.; and High Standard Mfg. Co., New Haven, Conn.

Ownership of all of these plants by the United States, is, in the opinion of the War Department, necessary to our own national defense. Other plants may be acquired later.

To the extent that any of the plants continue to manufacture for the account of Great Britain, Defense Plant Corp. will receive a rental or a charge at a rate sufficient to amortize the cost of the plant over a period of five years.

United States Firms Invited To Exhibit at Chilean Show

Participation by United States' firms in the National Exposition of Industries and Commerce to be opened in Santiago in November has been invited by the Chilean government.

Inland Steel Defines Policy; Will Gear New Bookings to Previous Sales

■ IN AN effort to meet unusual market conditions, caused by the national defense program, and to simplify handling of orders, Inland Steel Co., Chicago, has issued the following statement of policy:

"For six months orders have been received by us in tonnages exceeding our productive capacity. This has resulted in a substantial increase in our backlogs and a corresponding extension of delivery promises.

"Much of the tonnage now reaching us is being placed with a view toward securing protection. That is, customers fearful of losing a place in future schedules are sending in specifications for remote deliveries. Very few buyers can accurately forecast their requirements six, nine or twelve months in advance and therefore most of these orders are subject to change. This will call for an excessive and we believe needless amount of clerical work in our customers' offices and in our own.

"Because we believe this practice is unsound as well as unnecessary, we have adopted the following plan:

"1. Effective at once we will accept only such orders as can be included in our 1941 schedules and these only in relation to previous sales. As heretofore, all such orders will be subject to prices in effect at the time of shipment.

"2. Except for tonnage required for definite contracts in connection with the defense program, no orders for 1942 delivery will be accepted until our books are opened

for the first quarter of 1942. Our customers will be duly notified when this is done. If present conditions prevail at such time it will be our intention to (a) first provide for our proper share of the defense tonnage and (b) allocate the remaining tonnage equitably among our customers in relation to previous sales.

"3. All commitments and schedules are of course subject to any government regulations which may be imposed.

"4. Because of this plan our weekly rolling program will be discontinued until further notice."

"No Artificial Delays," Urges Ordnance Chief

■ Plea that artificial influences not be allowed to retard the armament program was voiced by Maj. Gen. Charles M. Wesson, chief of ordnance, United States Army, before a defense dinner attended by 1200 industrialists in Chicago, March 17. Meeting was sponsored jointly by the Army Ordnance Association, Illinois Manufacturers' Association

One Tower, Three Cars

■ Three carloads in one piece is this huge 123-foot, 138-ton petroleum cracking tower enroute from Beaumont, Tex., to a Ft. Worth, Tex., refinery. Fabricated in New Jersey, the tower was shipped to Beaumont aboard the tanker JAPAN ARROW and loaded on two depressed gun carriages and a flat car. In its rail shipment it had a clearance of only 4 inches at some points

and the Illinois Manufacturers' Costs Association.

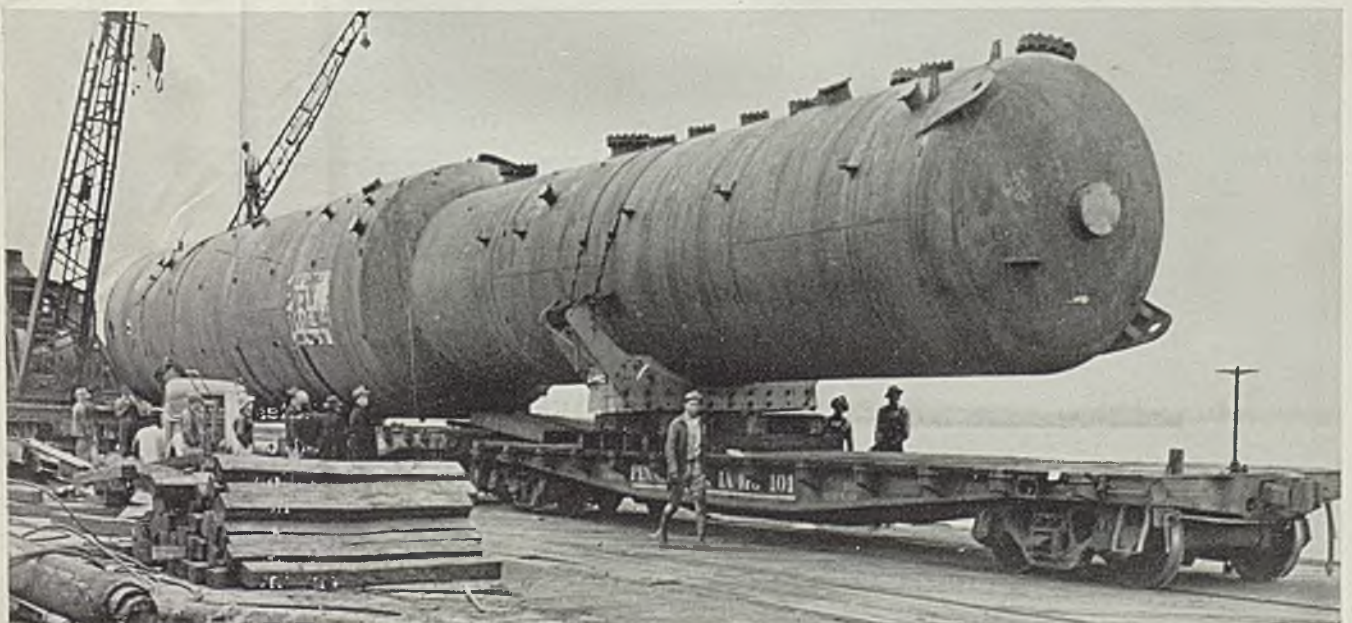
General Wesson, obviously referring to present labor difficulties, declared this is no time for bickering. "We are coming to grips with real interferences, and are hopeful that no artificial interferences will be added. I refer to delays arising out of selfishness, fear or arrogance on the part of government, or on the part of management or labor."

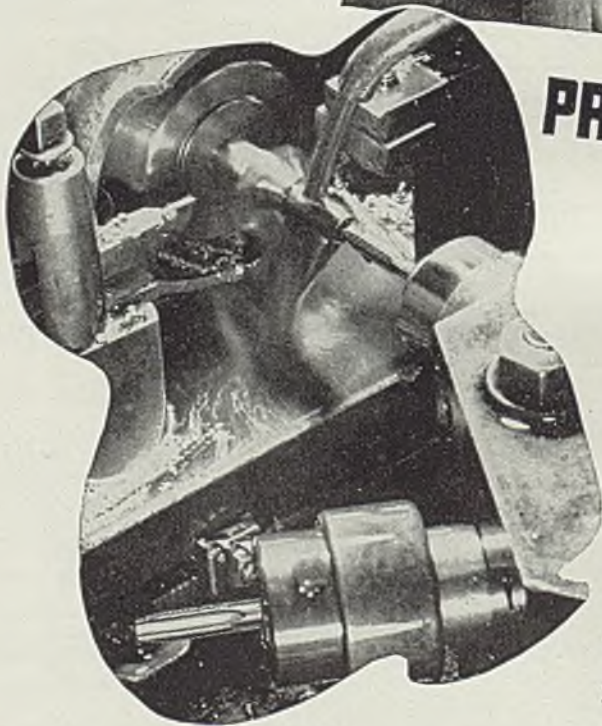
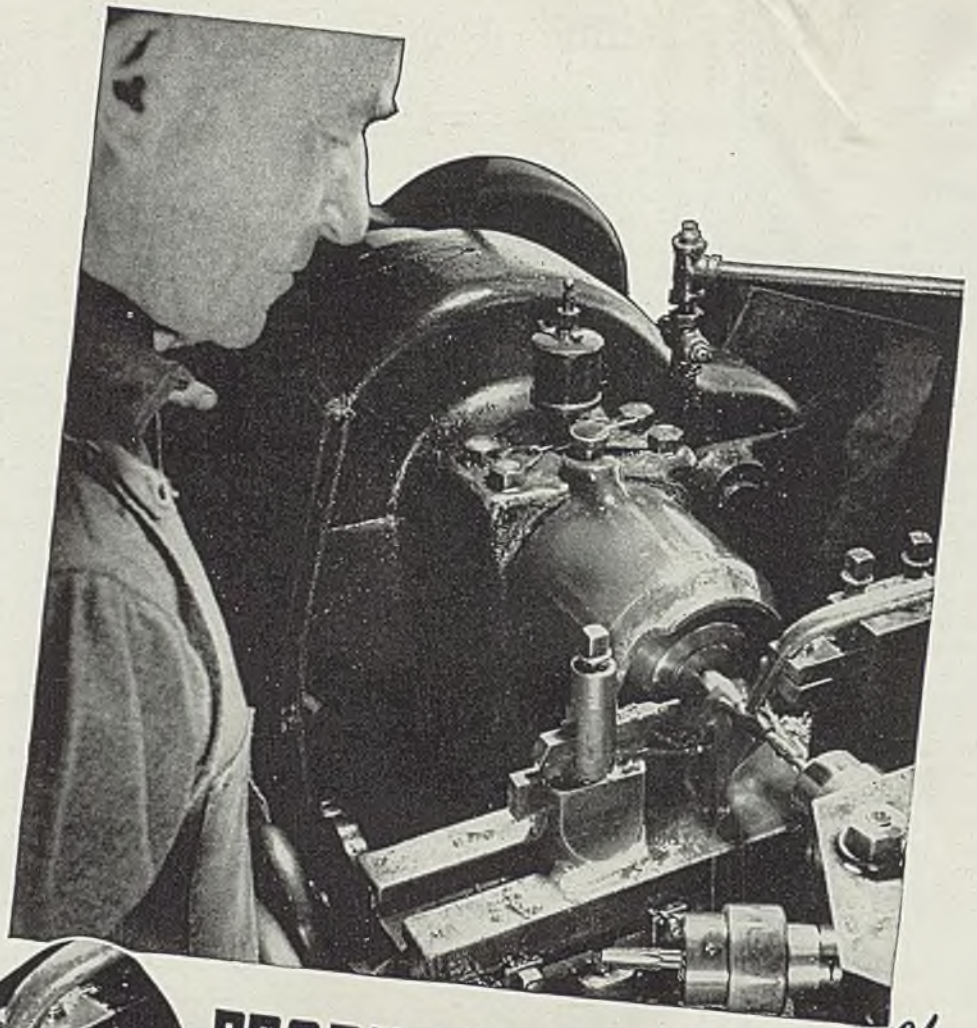
It will be 6 to 18 months before anything approaching volume production can be realized on noncommercial ordnance. Of the \$130,000,000 of educational orders placed some 18 months ago, approximately 90 per cent of deliveries have been made. These educational orders, for the most part, were placed with high-cost producers. When the real defense program started, orders were placed on competitive bid principles, which had the effect of throwing most of the work to low-cost producers. As these become filled to capacity with backlogs, the trend is toward the higher-cost producers.

Robert M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill., and president, Illinois Manufacturers' Association, drew a parallel between profiteering and demands for unreasonable pay for skill. "Fair wages and fair profits go hand in hand."

Other speakers included: Fred A. Preston, chief, Chicago ordnance district; James S. Knowlson, president, Stewart-Warner Corp., Chicago; and Col. L. A. Codd, editor, *Army Ordnance*.

■ Columbia Steel Co., United States Steel Corp.'s West coast subsidiary, will install a standard-type Heroult electric furnace for its foundry department at its Pittsburg, Calif., plant.





PRODUCTION: *Up 50%*

A certain New Jersey manufacturer reports this very good saving in tapping costs. This screw machine is turning out a part made of 3½% nickel steel. Tapping a ¾-24 hole was the "bottleneck" of the job until they switched to "G. T. D. Greenfield" Taps. The solution recommended was a roughing cut with a "Gun" Tap and the last .010 of an inch removed by a ¾-24 High Speed Steel Ground Thread "G. T. D. Greenfield" Tap. Production on the whole job jumped 50%.

To manufacturers everywhere who must use every possible means of increasing production, we say—"Have you thoroughly investigated 'G. T. D. Greenfield' Taps? —Ground Thread High Speed Steel for fast, accurate work; 'Gun' Taps for 'through holes'; 'Maxi' (the special surface treatment) for stringy or abrasive materials." "G. T. D. Greenfield" Engineers will arrange a test at your convenience.

GREENFIELD TAP & DIE CORP., GREENFIELD, MASS.

Detroit Plant: 2102 West Fort Street

Warehouses in New York, Chicago, Los Angeles, San Francisco

In Canada: Greenfield Tap & Die Corporation of Canada, Ltd., Galt, Ont.

GTD **GREENFIELD**

TAPS • DIES • GAGES • TWIST DRILLS • REAMERS • SCREW PLATES • PIPE TOOLS

STEEL

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

What to do about housing defense workers perplexes motor city officials. Tapering in auto production may release enough men for defense plants to solve problem . . . Packard streamlined model nearing announcement date as assemblies start . . . Wild trading in nonferrous metal markets . . . Pontiac tooling for production of Swiss anti-aircraft cannon originally planned for British manufacture

DETROIT
■ CRITICAL housing situation in Wayne county is a potential bottleneck which could have far-reaching effects on automobile production in the Detroit area, if not on the entire industry. By late summer, 50,000-100,000 additional workmen are going to be needed to staff defense plants here. These men can come either from the outside or from the working forces of automobile and body companies. If the former is to be the case, then housing accommodations for 150,000 people must be found; if the latter, then automobile production must be scaled down accordingly.

Estimates show that at most there are only 9000 unoccupied dwelling units in Wayne county, and these are being absorbed steadily. Home building will do well to total 20,000 for the year. So there appears to be a real emergency housing problem, but as yet no solution has been worked out.

Many conferences have been held jointly by real estate operators, auto plant executives, insurance men, builders, government housing experts and other interested groups, seeking to determine some way out of the difficulty, but a stalemate has been the only result. Builders do not want the government to enter the low-cost housing business here and at the same time are wary of making any large investment in emergency housing for renting because they realize that a few years hence when the "bloom is off the rose" they will be stuck with their housing and it will soon become a

drug on the real estate market.

As a stopgap the purchase of 5000 trailers has been authorized by the government, these to form a sort of "flying squadron" housing which can be rented out to new defense workers. Trailers, however, create a number of new problems, including sanitation, parking facilities, etc., which often make them nuisances to municipalities.

The motor industry is coming to realize a dire housing shortage when the defense production is in full swing may mean enforced shutdown of assembly lines and the transfer of auto workers to defense plants. This would be little short of catastrophic in face of the industry's determined efforts to emphasize the vital role of passenger cars in the nation's economy. But if new workers cannot be accommodated, the only alternative is to transfer other employees.

Tapering in Production Likely

While a lot of worrying is going on over the problem, conceivably it may solve itself by virtue of the fact that large numbers of men may have to be laid off because of a greatly reduced market for cars this fall. The industry in a sense, and car dealers in particular, are to blame for this. Everywhere throughout the country the pressure to "buy now" is being applied. All sorts of wild rumors about impending shutdowns in motor plants are being

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fed out to drive in buyers. A typical one is that, after the model change, each producer will offer only one body style.

Certain it is, however, that after this spring there will be no more 600,000-car months for a while. Scaling down production this summer likely will bring with it an appreciable increase in costs of automobiles. New and stiff excise taxes for one thing, and unavoidable cost increases because of lower volume, for another.

Restyling of Complete Line In Store for Packard

In a week or two Packard is expected to announce its streamlined model, first assemblies of which were made last Tuesday. The car will be priced to compete in the Oldsmobile class and will sport a completely restyled body which eclipses anything yet on the market in streamlining. The familiar Packard radiator shell contour is retained in smaller and narrower form at the front, although wide, rectangular shaped grilles extend across the front end in a low position for air intake. Motor will be a six, according to present information.

Balance or carryover of the 1941 model run on other Packard lines will have front ends restyled in the new motif and when succeeding models are introduced they will all be styled after the pattern of the new job to be introduced shortly.

In the effort to round up all aluminum possible, Ford Motor Co. has been buying up aluminum parts stocks from dealers, paying list prices, for items such as pistons and cylinder heads, and 12 cents a pound for smaller pieces. Many of these parts have been superseded long since and dealers are glad to clear them from their shelves.

A local die casting supplier, faced with the necessity of closing down some casting machines because of aluminum shortage, averted the

shutdown by trading a surplus tonnage of zinc for the requisite amount of aluminum.

When metal supplies get tight, as at present, wild trading in stocks becomes prevalent and despite efforts at price regulation the market tends to get out of hand at times. For example, a buyer of pole-line hardware reports that its source, in the Chicago district, is being compelled to pay 16¼ cents a pound for galvanizing zinc, when the official spot price is 7.25c St. Louis. And just the other day, efforts were being made to interest Detroit companies in 100,000 pounds of electrolytic zinc—at 20 cents a pound—and the material contained 6 per cent lead to boot!

May Produce Antiaircraft Cannon at Pontiac

Pontiac Motor division is one of the few General Motors units which has not figured as yet in plans for defense production. It is learned now that Pontiac is in process of tooling up for manufacture of the Oerlikon 20-millimeter antiaircraft cannon. A Swiss design originally planned for manufacture in Great Britain, the gun fires several hundred shots a minute and embodies an unusual arrangement for quick sighting. The operator is virtually strapped to the gun, in such a way that as he moves his body to sight on aircraft the gun moves with him.

Preliminary tooling was completed some months ago on the gun by the British and this has been transferred to Pontiac. Additional equipment now is being bought to supplement the original tooling. A variety of machine equipment for drilling, rifling, grinding, etc., is required, as well as various types of assembly devices. Size of the initial order has not been disclosed, but it appears likely production will be under supervision of the U. S. government and not the British, since in recent weeks, most all the British projects have been absorbed by this country, supposedly because of exhaustion of British funds.

Steel Orders for Motor Cars Now "In the Hopper"

Some steel companies report they expect to complete shipments of material to automotive accounts for 1941 models by the end of March, confirming the report published here last week to the effect 1941 models may be completed by the end of May.

Congestion of steel company order books still is severe and instances are heard of tonnage being placed for 1942 shipment. The latter, however, is not automotive steel. Motor companies in general

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,126
Feb.	317,520	422,225	.....
March ...	389,499	440,232	.....
April	354,266	452,433	.....
May	313,248	412,492	.....
June	324,253	362,566	.....
July	218,600	246,171	.....
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
Feb. 22	129,240	102,570
March 1	126,550	100,855
March 8	125,915	103,560
March 15	131,620	105,720
March 22	124,805	103,395

†Comparable week.

have attempted to cover for steel well in advance of customary dates and suppliers are making every effort to insure their needs will be taken care of.

While priorities are making it difficult if not impossible to obtain chrome-nickel stainless steel for nondefense purposes, it is understood requirements for straight-chromium stainless, such as used for moldings, can be handled.

Production of leaded or free-machining steels has been suspended by some companies, and sales restricted to former buyers by others. One interest has abandoned all production because of the extra time required in processing the material.

A rather complete about-face in the attitude of buyers toward suppliers has been in the making over the past few months. The notoriously tough automotive buyer who has been prone to dictate prices, deliveries and other matters to his suppliers has shed his wolf's clothing and now is a most pleasant and co-operative individual. Particularly do buyers recognize the enormous difficulties which steel companies are having in allocating tonnage equitably. They realize that threats and harsh words can do no good today, in a sellers' market.

Tripling of Floor Space in Fisher Memphis Plant Likely

Fisher Body division plant at Memphis, Tenn., has been selected as the central source for airplane parts and subassemblies which General Motors is supplying for bombers to be built by North American Aviation at Kansas City. The Memphis plant has floor area of 250,000 square feet and additions

have been authorized, when required, up to a total of 750,000 square feet. Present manufacturing activity will be allocated to other Fisher plants, and operations which cannot be carried out in the Memphis plant will be assigned to General Motors divisions which have the necessary facilities. Thus the projected flow of parts will be from scattered GM plants to Fisher Body at Memphis and finally to North American at Kansas City.

Breakdown of the 9500-pound weight of a typical 2½-ton army truck shows some interesting figures on amounts of various materials required. Carbon steel, alloy steel, gray and malleable iron amount to 11,000 pounds, indicating the large allowance necessary for scrap in processing. Other metals are: Lead 32 pounds; zinc 30, copper 70, aluminum 20, manganese 55, nickel 8, rubber 450, paint 86, cotton 200, wood 300, glass 40, paper and pulp 18, plastics 4, and smaller amounts of tin, magnesium, molybdenum, chromium, asbestos, cork, jute, shellac and graphite.

Spicer Mfg. Co. in Toledo, O., is planning a \$350,000 addition to its plant to house general offices and create additional manufacturing space. Heavy-duty transmissions and propeller shafts for tanks and trucks for defense purposes have constituted a large volume of recent business.

Buick Extending Scrap Salvaging Deptment

■ Salvage department of Buick Motor Division, Flint, Mich., growing in importance with the national defense need for conserving scrap metals and salvaging them according to alloy content, will be augmented by the construction of a salvage factory adjacent to the engine, gear and axle plants.

This building, with 2700 square feet of floor space, will house special machinery and equipment for reclaiming waste material from the three plants it serves. The machines will include crushers to reduce all waste metal to size convenient for handling, "chip wringers," which wring oil and moisture from the scrap metal, and bucket elevators for loading.

The project includes covered loading docks for the railroad siding adjacent to the building and special loading hoppers from which the material is loaded into gondolas.

Plans also are complete for the addition of approximately 10,000 square feet to the final assembly line, including the extension of the final assembly building with approximately 1,000 square feet of floor space and conveyor equipment.

Introducing

2 Low-Priced
Induction Units for
Heating and Localized
Surface Hardening of
Small Parts.

The New Streamlined
TOCCO Utility Junior
(20 KW OUTPUT)



SPEEDY • ECONOMICAL • ACCURATE

A new TOCCO Utility Junior (20 KW output), smaller in size and lower in cost, is now available. Ideal for use in plants where installation of more elaborate heat-treating equipment is not warranted. It provides fast, economical operation for treatment of small parts in small runs. A self-contained, efficient machine, easy to install.

FOR TOCCO HEATING

For annealing, brazing, soldering, heating for forming and forging. All-metal cabinet encloses high frequency motor generator set (9600 cycles), standard TOCCO controls, air filters, welded steel base and other TOCCO features. Unit is waist high—3'x4'. Write for details of Model 20 SC MG 10.

FOR TOCCO HARDENING

Accurate, one-station unit for TOCCO-hardening of small parts. Hardens at wearing surfaces only with depth and degree of hardness closely controlled. Transformer housing with rotatable transformer panel, and work pan are added to the basic 20 SC MG 10 machine. Has high frequency motor generator set (9600 cycles), pre-set, full automatic controls, quench and cooling water valves and other proved TOCCO features. Floor space—3'x4'. Only water and power connections are necessary for installation. An efficient, easy-to-operate machine that cuts costs. Full details on Model 20 ST MG 10 will be sent on request.



PRICES BEGIN AT \$3950
F. O. B. CLEVELAND, OHIO

See the new TOCCO Utility Junior in operation at the A. S. T. E. Machine & Tool Exhibition, Space 202, Detroit



For TOCCO-hardening variety of larger parts. The universal TOCCO Junior, equipped with one to three hardening stations. Self-contained. Easy to operate.

THE
CRANKSHAFT
COMPANY

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TOCCO

"Why Heat Treat the Whole Piece?"

Army, Navy To Assign Subcontractors' Ratings

■ INFORMAL working arrangement between the Army and Navy Munitions Board and the Office of Production Management's priorities division has been reduced to a formal plan for the operation of the priorities system. This was announced last week by E. R. Stettinius Jr., priorities director, who also made public:

1. First administrative order by the director of priorities providing formal authorization for the handling of priorities for items on the priorities critical list by the Army and Navy Munitions Board, and validating previous priorities orders and actions.

2. Priorities critical list, never be-

fore made generally public, setting forth all items on which the Army and Navy field services can automatically assign priority ratings.

3. Official instructions from the War and Navy Departments to their supply, arms, services, bureaus and offices.

4. Revised circular bringing up to date the description of the priorities system in operation.

A major change in the formal plan, which follows the temporary working arrangement announced Feb. 17, is that the Army and Navy Munitions Board and its officers and agents, will now administer the assignment of preference ratings to Army and Navy orders not only for

prime contracts and first subcontracts, but also for all other subcontracts for critical list items entering into such orders.

The Army and Navy Munitions Board will continue to operate wholly within the framework of the priorities critical list. A number of new items has been added.

Allocation of such products by the priorities division will take precedence over ratings assigned by the Army and Navy field staffs when shortages are so acute as to make necessary a diminution of quantities flowing to military channels.

Authority for the priorities system is vested in the director of priorities and the priorities division of the Office of Production Management, and all priorities certificates will go out over the signature of Mr. Stettinius, but will be actually distributed by the Army and Navy field services when the material involved is on the priorities critical list.

The division will continue to

Priorities Critical List, Applicable to Metals Industries

—A—

Aiming circles; aircraft, all types including lighter-than-air; altimeters; aluminum and aluminum alloys, pig or fabricated; ambulances, service specifications; ambulance boats; anti-aircraft equipment;

Ammunition, all types; angledozers; armor plate; aircraft detection equipment.

—B—

Barges; batteries, radio, ship, fire control; bearings, roller and ball; ammunition link and cartridge belts; boats (most type adaptable to military service); boilers, power plant and heating; bombs; booms; ammunition boxes;

Brass, pig or fabricated; bridges; bronze, pig or fabricated; battery chargers, portable; bulldozers.

—C—

Cables, electric; cameras, aeronautical, gun, triangulation, motion picture and still; carts, hand drawn, reel, chemical, mortar, ammunition, weapon; castings, steel, heavy brass (over 150 lbs.), aluminum; catapult, aircraft; hydraulic gun charger; chest, service types;

Chromium alloy steel; combat vehicles; containers, galvanized, portable refrigerated; coils, service specifications; compressors (air); computers, intermediate and major calibers, time and distance, line of position; condensers, steam; control equipment for electric motors, automatic; cooking outfit; corrector, percentage, fire control; cranes; cutters, wire, and carriers (special service types); cylinders, chemical (portable), compressed gas or air.

—D—

Demustardizing equipment; diamond point tools; dies, forging, diamond; distribution boxes; drydocks, floating.

—E—

Electric generators, motors and motor generators, dynameters, all except NEMA standard types, meeting AIEE specifica-

tions and rules; energizers, aircraft electric.

—F—

Fire control instruments and equipment; flash lights, service types; flying equipment; forgings, brass, steel, aluminum; floodlighting equipment.

—G—

Gastight doors and frames; generating units, service types; generators, electric, except NEMA standard types of AIEE specifications; grenades; gages, inspection; goggles, service type; grader, road; guns, all types and calibers, (including carriages and mounts), limbers, and caissons.

—H—

Hammers, power-driven; hoist, ammunition; hoists, power or hand; howitzers, all types and calibers, with limbers, caissons, carriages and mounts.

—I—

Instruments, battery commander, electro-diagnostic, observation, optical (all types-complete), stereoscopic training, surgical, surveying, azimuth and azimuth mills, self-synchronous (engine); interphone equipment, (aircraft, vehicular).

—J—

Jigs and fixtures.

—L—

Lamp equipment, signal; lighters and barges; lighting equipment, electric (portable), service types; lockers, steel; locomotives, diesel, gasoline, electric.

—M—

Machine, blasting; machine guns, all types and calibers with mounts, sights, and tripods; machine and metalworking tools; machinery, forging, and power-driven, for casting, cutting, grinding, hoisting, melting, metal pressing, welding, refrigerating; magazines, small arm ammunition; mess outfits, field, barrack, ship; meters, electric, drift; mines; mine equipment, submarine; mine planters and

yawls; magnesium and alloys, pig or fabricated; monel metal; mortars, all types and calibers with carriages, mounts; motors for pontons; motorcycles, solo or side car (service types).

—N—

Nets, antisubmarine and camouflage; neoprene; nickel, pig or fabricated; nickel alloy steel.

—P—

Pontoon equipment; pumping sets, all types.

—R—

Range, field, complete with equipment; rangefinders; ranging equipment, sound; reels, firing; remote control equipment for guns and searchlights; rifles, magazines, machine, automatic, semiautomatic.

—S—

Ship plates; searchlights; searchlight control instruments; ships, all types, complete; small arms, all types and calibers; steel, electric furnace, bullet, armor plate, special treatment, tungsten, nickel, chrome, vanadium; stoves, tent; submarine mine cable, steel; submarine safety and escape devices.

—T—

Tanks, cartridge, combat, all types and models, powder; telephones, all special service types, radio, and equipment; telegraph sets (service specifications); tin; tools, precision, hand; torpedoes; tractors, military; trailers; transformers, electric; trucks, motor (all special service types); tungsten, ferrotungsten and tungsten ore; tungsten alloy steel.

—V—

Vanadium and vanadium alloys; vehicles (service types).

—W—

Watches, service types; wire, service types (see conductor, field (S.C.)).

—Z—

Zinc.

handle directly the assignment of ratings for items not on the critical list, for important civilian projects, and the priority actions for the allocation of certain materials which must be handled on an industry-wide basis. Such direct allocations by the priorities division may modify individual priority certificates.

Provisions in revised system:

1. Army and Navy Munitions Board will assign ratings to prime contracts of certain foreign governments, including Great Britain and Canada, and provision is made for the extension of these ratings to subcontracts.

2. Only an official preference rating certificate will be binding, but manufacturers will be encouraged to inform their subcontractors and suppliers as to what ratings may be extended to their work if a priority certificate is requested and issued. This will enable subcontractors to plan for readjustments which might be necessary if and when a preference rating certificate is issued.

3. A completely new set of forms

will be issued in operating the priorities system. However, previously issued certificates and extensions will remain valid.

4. In special situations, such as the case of companies engaged almost wholly in defense work, or in case of special urgency in connection with a particular defense project, the priorities division is prepared to grant authority for the automatic use of limited blanket ratings which will be valid for a limited period only.

5. In administering the system, the priorities division can give priority aid to important civilian projects, as well as military projects or foreign orders, and will continue to see to it that civilian needs are carefully balanced with defense needs at all times.

6. The preference rating certificate will continue to be the principal administrative mechanism in the operation of the system. These certificates or ratings may be applied "automatically" to Army and Navy orders by the Army and Navy Muni-

tions Board and its agents for items on the priorities critical list. The priorities division, however, may also issue specific certificates for individual contracts, whether the items involved are or are not on the priorities critical list, and may also use such techniques as blanket ratings and industry-wide priorities for allocations in order to accomplish desired objectives.

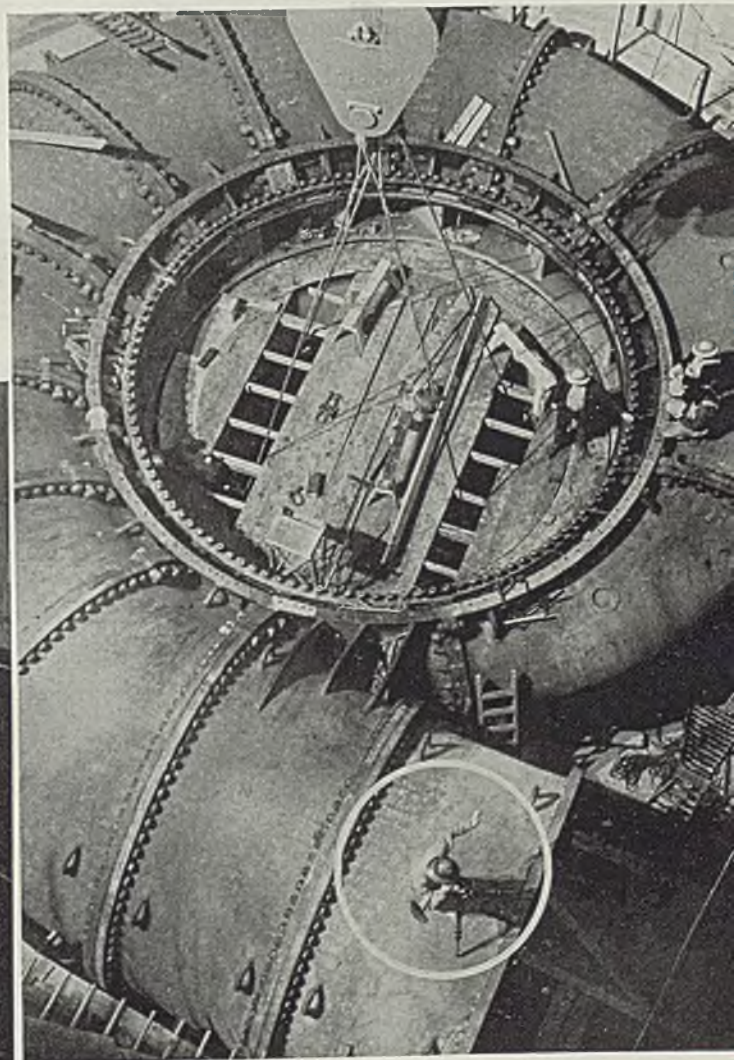
7. The priorities critical list will be subject to revision each month. Items on the list are interpreted to include all fabricated parts necessary for the completion, maintenance or operation of such items.

The revised critical list includes a number of important items which have not appeared on the list before. These are: Aluminum and aluminum alloys, pig or fabricated; magnesium and alloys, pig or fabricated; neoprene (synthetic rubber); nickel, pig or fabricated; nickel alloy steel.

The list on page 38 is a condensation, items not applicable to the metalworking industries having been deleted.

Grand Coulee Starts To Work, While Construction Progresses

■ Scroll case for the first of the 150,000-horsepower turbines was being installed at Grand Coulee dam, Washington, on March 22 when the first two small generating units, providing 27,000 horsepower, were turned on. When the larger units are completed, the project will make available 2,700,000 horsepower. Size of the turbine installation, at right, may be judged by the relative size of engineer, encircled in foreground. At left, a 130-pound bolt is lifted into place in the connection of a rotating shaft, which will connect turbine to a 108,000-kilowatt generator. NEA photos



Construction Awards Head List of Government Defense Commitments

■ PLANT expansion and construction contracts comprised a large part of the \$129,074,409 defense awards last week reported by the Departments of War and Navy. With few exceptions, awards for manufactured defense products were small and by their nature show the program is well underway.

Defense Plant Corp. agreements were reported last week by the War department for the following: Cleveland Pneumatic Tool Co., Cleveland, \$3,739,000 for additional machinery and equipment for manufacture of aircraft parts;

Republic Aircraft division of Republic Aviation Corp., Detroit, \$1,500,000 for new plant at Detroit, machinery and equipment for manufacture of hardened and ground precision parts;

Dow Chemical Co., Freeport, Tex., \$3,007,407 for construction, machinery and equipment at the Freeport plant;

Wyman-Gordon Co., Harvey, Ill., \$1,133,495 for machinery and equipment to expand the company's facilities for forgings manufacture.

Contract for \$9,436,816 was awarded by the War department to Sullivan, Long & Hagerty, Bessemer, Ala., and Algernon Blair, Montgomery, Ala., for construction of a bag-loading plant at Childersburg, Ala. Machinery and equipment is estimated to cost additional \$1,091,000.

Supplemental contracts totaling

\$4,039,675 were awarded by the War department to Hunkin-Conkey Construction Co., Cleveland, for an ordnance storage depot adjacent to the shell-loading plant under construction at Ravenna, O.

Additional troop housing facilities at Ft. Jackson, South Carolina, were contracted for by War department at total of \$3,924,607. J. A. Jones Construction Co., Charlotte, N. C., received the award.

Gillmore-Carmichael-Olson Co., Cleveland, was awarded a \$957,000 contract for construction of a government-owned gas mask charcoal plant at Fostoria, O. National Carbon Co., Fostoria, will operate the plant.

To Build Temporary Housing

Claussen-Lawrence Co., Augusta, Ga., received a \$935,962 contract from the War department for construction of temporary housing, roads and utilities at the Augusta army air base.

Russ Mitchell Inc., T. B. Hubbard Construction Co., Knutson Construction Co., and Joseph F. Meyer Jr., all of Houston, Tex., received from the War department a supplemental contract for construction work at Camp Hulen, Texas, at a total of \$622,788.

Construction contracts for airplane assembly plants were also reported by the War department as follows: Manhattan Construction

Co., Muskogee, Okla., and Long Construction Co., Tulsa, Okla., for a heavy bomber assembly plant at Tulsa. Total estimated cost, \$10,476,400;

Austin Co., Cleveland, \$10,511,400 for a heavy bomber assembly plant at Ft. Worth, Tex.;

C. L. Tarleton Construction Co. and McDonald Construction Co., both of St. Louis, and S. Patti Construction Co., Kansas City, Mo., an award totaling \$3,706,484 for a medium bomber assembly plant at Kansas City, Kans. This cost does not include that of required structural steel, to be furnished by the government. Final cost is estimated at about \$7,000,000.

Navy department entered into a contract with Cooper-Bessemer Corp., Grove City, Pa., for propelling machinery for 16 motor minesweepers at a total cost of \$1,952,000. Unit cost is to be \$122,000.

Three contracts totaling \$1,077,000 for extension of plant facilities were reported by the Navy as follows: Rohr Aircraft Corp., Chula Vista, Calif., \$567,000; Woodward Governor Co., Rockford, Ill., \$380,000; and The M. B. Mfg. Co. Inc., New Haven, Conn., \$130,000.

Pennsylvania Forge Corp., Philadelphia, received a \$2,500,000 contract from the Navy department for additional facilities for production of heavy forgings.

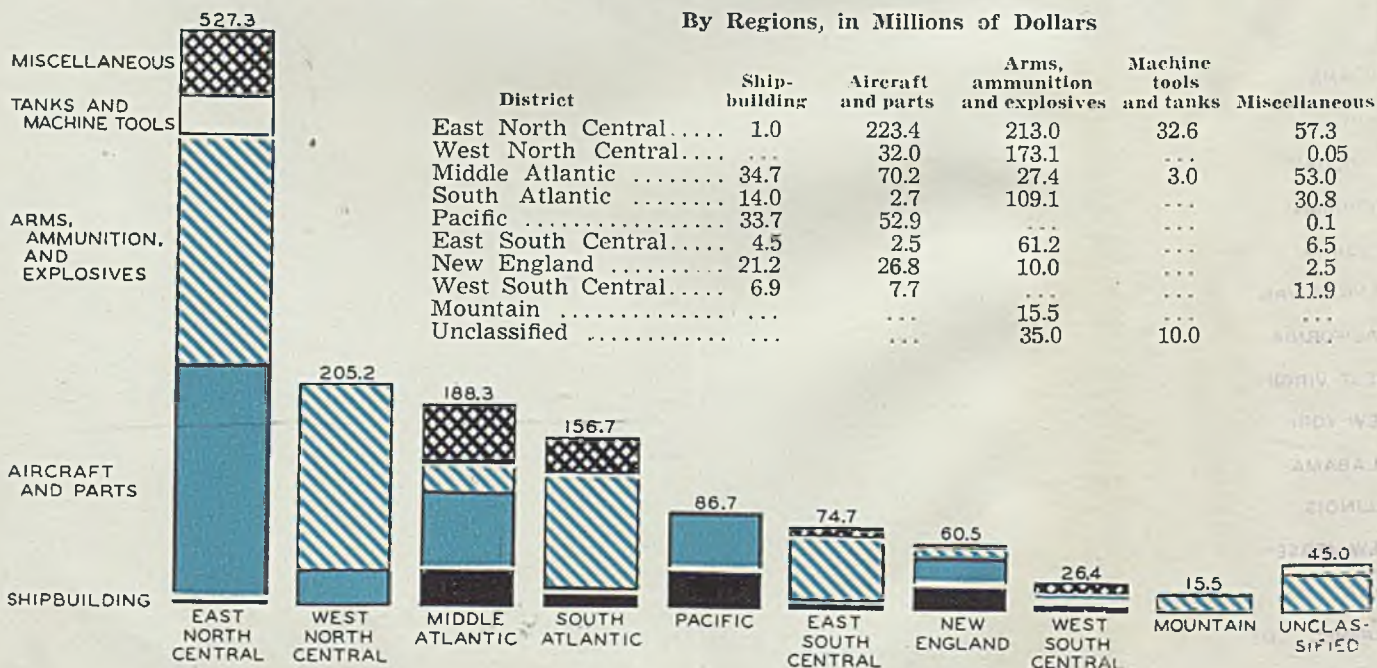
War department last week reported the following:

Ordnance Department Awards

Alden Supply Co., Philadelphia, tools, \$2837.
Allegheny-Ludlum Steel Corp., Watervliet, N. Y., steel rods, \$225,595.08.
Allen Electric & Equipment Co., Kalama-

Defense Contracts for Expansion of Plant and Facilities

By Regions, in Millions of Dollars



200, Mich., test stands, \$7227.75.

Allis-Chalmers Mfg. Co., La Porte, Ind., artillery materiel, \$5,120,229.

American Brass Co., Waterbury, Conn., brass, \$56,876.40.

American Car & Foundry Co., Berwick, Pa., idlers, alloy castings, \$14,685.77.

American Smelting & Refining Co., Federated Metals division, Whiting, Ind., manganese bronze ingots, \$2227.50.

American Steel & Wire Co., New Haven, Conn., steel cables, \$26,949.12.

Associated Spring Corp., Wallace Barnes Co. division, Bristol, Conn., springs, \$1689.60.

Automatic Die & Products Co., Cleveland, fixtures, \$1071.

Baird Machine Co., Bridgeport, Conn., tumblers, \$1758.

Baldwin Locomotive Works, Philadelphia, hydraulic testing machines, \$10,210.

Barber-Colman Co., Machine & Small Tool division, Rockford, Ill., counterbores, \$2155.20.

Bay State Abrasive Products Co., Camden, N. J., grinding wheels, \$1450.15.

Bendix Aviation Corp., Bendix, N. J., starters for light tanks, tools, electric lamps, \$123,194.27.

Bliss, E. W., Co., Brooklyn, N. Y., vertical presses, \$9750.

Borg-Warner Corp., Rockford Drilling Machine division, Rockford, Ill., transmission clutches, \$59,301.70.

Bossert Co., Utica, N. Y., cartridge cases, \$1,290,000.

Braeburn Alloy Steel Corp., Braeburn, Pa., high carbon steel, \$8557.22.

Bridgeport Machines Inc., Bridgeport, Conn., milling machines, \$1075.

Brown-Brockmeyer Co. Inc., Dayton, O., motors and starting switches, \$1024.29.

Carborundum Co., Philadelphia, grinding wheels, \$1266.

Carnegie-Illinois Steel Corp., Chicago, chrome steel, \$10,837.38.

Carpenter Steel Co., Reading, Pa., steel rods, \$51,935.94.

Christiansen, C. B., Newark, N. J., presses, \$3470.

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, grinders, \$4905.22.

Cincinnati Shaper Co., Cincinnati, horizontal shapers, \$2860.

Circular Tool Co. Inc., Providence, R. I., metal saws, \$3150.

Cleveland Automatic Machine Co., Cleveland, lathes, \$71,534.45.

Cleveland Twist Drill Co., Cleveland, drills, \$1890.96.

Collins Electric Co. inc., Springfield, Mass., wire, \$2101.04.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., small arms materiel, feeders, \$17,766.18.

Consolidated Machine Tool Corp., Rochester, N. Y., planers, \$167,470.

Continental Machines Inc., Minneapolis, machines, \$1551.25.

Continental Motors Co. p., Muskegon, Mich., ball bearings, \$2880.

Continental Steel Corp., Superior Sheet Steel Co. division, Canton, O., plates, sheets, \$59,200.

Crucible Steel Co. of America, New York, steel, \$2246.80.

Cummings Machine Works, Boston, fixtures, \$17,893.35.

Despatch Oven Co., Minneapolis, despatch furnace, \$7719.

Detroit Bevel Gear Co., Detroit, gears, \$47,528.25.

Detroit Broach Co. Inc., Detroit, broach section details, \$1198.80.

Dietz, R. E., Co., Syracuse, N. Y., head lamp assemblies, \$1587.

Drying Systems Inc., Chicago, heating and ventilating units, \$12,500.

Duplex Mfg. Corp., Sherman, N. Y., steel chests, \$54,821.25.

Electric Arc Cutting & Welding Co., Newark, N. J., arc welders, \$1095.

Emels Electrical Service, Davenport, Iowa, connectors, \$2716.69.

Empire Electric Brake Co., Newark, N. J., spare parts and brakes, \$5334.58.

Enterprise Tool & Gear Corp., Detroit, gears, \$164,085.

Exact Weight Scale Co., Columbus, O., scales, \$8873.46.

Ex-Cell-O Corp., Continental Tool Works division, Detroit, cutting tools, \$3595.92.

Federal Screw Works, Detroit, screws and pins, \$10,717.68.

Federal Tool Corp., Chicago, gages, \$10,041.

Felt & Tarrant Mfg. Co., Chicago, compotometers, \$2040.

Finkl, A., & Sons Co., Chicago, forgings, \$44,200.

Firth-Sterling Steel Co., Philadelphia, tool steel, \$1463.24.

Fischer, Charles, Spring Co., Brooklyn, N. Y., small arms materiel, \$9111.29.

Follansbee Steel Corp., Follansbee, W. Va., plate sheets, \$5967.39.

Gallmeyer & Livingston Co., Grand Rapids, Mich., grinders, \$1864.

General Electric Co., Schenectady, N. Y., coils, \$1405.40.

General Electric Supply Corp., Meriden, Conn., lighting fixtures, \$2913.52.

General Motors Corp., Harrison Radiator division, Lockport, N. Y., coolers, \$27,861.60.

General Tool Sales Co., Philadelphia, tools, \$1360.80.

Goddard & Goddard Co. Inc., Detroit, cutters, \$2912.99.

Goepfert & Buck Co., New York, hardware, \$2130.80.

Grainger-Rush Co., Boston, circuit breakers and current transformers, \$2031.

Graybar Electric Co. Inc., Davenport, Iowa, ammeters, \$1488.06.

Greenerd Arbor Press Co., Nashua, N. H., hydraulic presses, \$1396.56.

Greenfield Tap & Die Corp., Greenfield, Mass., hand taps, gages, \$14,287.45.

Hanson-Whitney Machine Co., Hartford, Conn., gages, \$11,758.80.

Hayes, Charles E. Co., Springfield, Mass., electrical supplies, \$1565.65.

Hess & Barker, Philadelphia, counter-shaft assemblies, \$1050.

Hobart Bros. Co., Troy, N. Y., generating units, \$2,491,320.

Hobbs, John W., Corp., Springfield, Ill., meters, \$5420.

Hollup Corp., Chicago, electrodes, \$1489.20.

Hyster, Willamette, Co., Portland, Oreg., parts for which for Caterpillar tractor, \$1292.50.

Illinois Gage Co., Chicago, gages, \$2326.50.

Illinois Tool Works, Chicago, cutters, \$8243.40.

International Harvester Co., Chicago, adapters and parts, \$932,400.

Irwin Auger Bit Co., Wilmington, O., screwdrivers, \$1738.

Johnson, J. F., & Co., Philadelphia, gages, \$7632.

Johnson Brass Foundry, Roxbury, Mass., castings, \$1196.26.

Jones & Lamson Machine Co., Springfield, Vt., pedestal comparator, \$2722.

Kobe Inc., Huntington Park, Calif., gages, \$7825.50.

LaSalle Steel Co., Hammond, Ind., carbon steel, \$2738.82.

Ledy Electric Co., Phillipsburg, N. J., electrical supplies, \$1548.67.

Leland-Gifford Co., Worcester, Mass., drill presses, \$1665.

Lincoln Park Tool & Gage Co., Lincoln Park, Ill., gages, \$12,562.02.

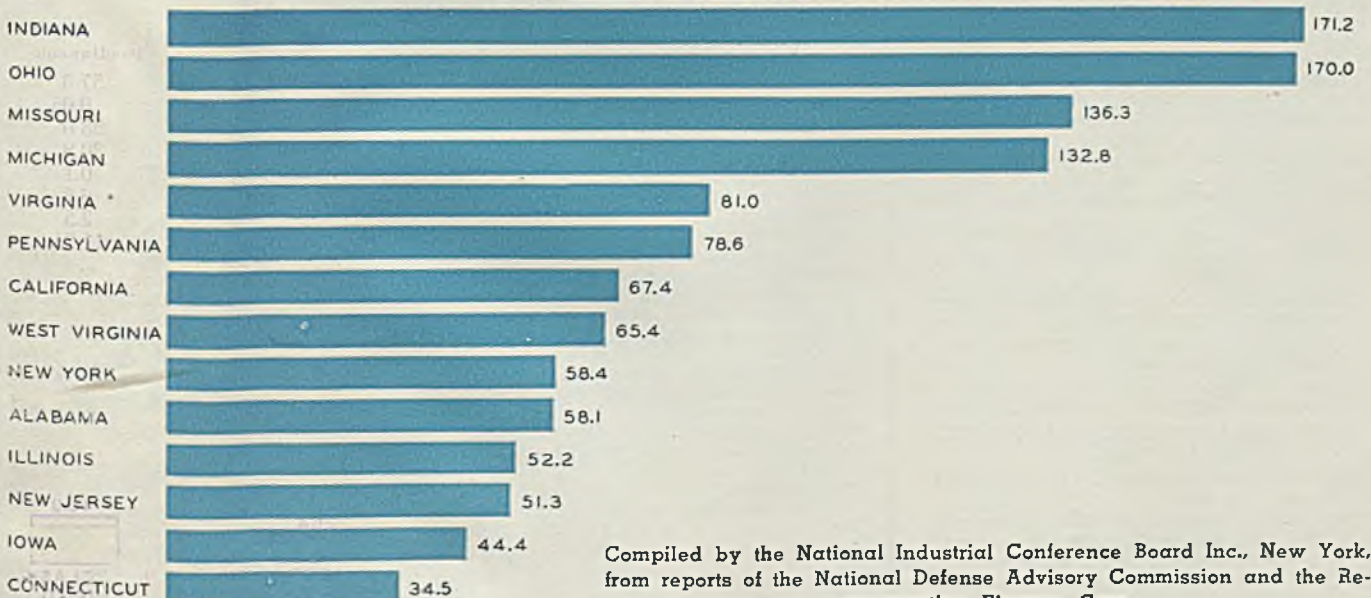
Lindley Electric Supply Co., Philadelphia, wire, \$4158.60.

Liste Corp., Clarinda, Iowa, pipe plugs, \$1000.

Lohse Automotive Service, Rock Island,

States Leading in Total Defense Plant Expansion Awards

Millions of Dollars



Compiled by the National Industrial Conference Board Inc., New York, from reports of the National Defense Advisory Commission and the Reconstruction Finance Corp.

PURCHASES UNDER

(In Week Ended March 8)

Iron and Steel Products

Ill., automotive equipment parts, \$3790.74.
 McCrosky Tool Corp., Meadville, Pa., boring bars, \$1376.74.
 Machinery Builders Inc., Long Island City, N. Y., tools, \$26,685.92.
 Mack Mfg. Corp., Allentown, Pa., pilot chassis, \$15,200.
 Merrill & Usher Co., Worcester, Mass., iron, steel, \$1065.41.
 Metal & Thermit Corp., Jersey City, N. J., welding electrodes, \$3780.
 Michigan Tool Co., Detroit, cutters, \$4185.46.
 Modern-Bond Corp., Wilmington, Del., friction discs, \$1060.60.
 Modern Tool & Die Corp., Philadelphia, gages, \$1170.
 Mohawk Machine & Tool Co., New York, gages, \$1424.
 Morse Twist Drill & Machine Co., New Bedford, Mass., hand taps, \$1420.61.
 Niagara Machine & Tool Works, Buffalo, power folder and brake, \$1574.
 Niles-Bement-Pond Co., Pratt & Whitney division, West Hartford, Conn., inspection gages, cutters, precision gage blocks, \$5466.50.
 Norris Stamping & Mfg. Co., Los Angeles, cartridge cases, \$690,000.
 Otis Steel Co., Cleveland, structural steel, \$2900.02.
 Pickands Mather & Co., Chicago, pig iron, \$1347.
 Precise Tool & Mfg. Co., Farmington, Mich., gages and equipment, \$4556.80.
 Precision Mfg. Co., Philadelphia, gages, \$4368.
 Putnam Tool Co., Detroit, bore reamers, \$3120.
 R. & M. Mfg. Co., Royal Oak, Mich., gages, \$8443.04.
 Remington Arms Co. Inc., Bridgeport, Conn., small arms materiel, \$3212.20.
 Republic Steel Corp., Cleveland, steel, \$18,722.30.
 Revere Copper & Brass Inc., Chicago, cartridge cases, \$2,235,200.
 Rheem Mfg. Co., Chicago, bomb practice bodies, \$3,051,657.
 Richards & Co., Malden, Mass., phosphor tin, \$1199.
 Roeper Crane & Hoist Works Inc., Reading, Pa., cranes, \$1495.
 Ryerson, Joseph T., & Son Inc., Chicago, carbon steel, \$7848.43.
 Scovill Mfg. Co., Waterbury, Conn., artillery materiel, \$1321.01.
 Service Caster & Truck Co., Albion, Mich., trallers, \$1480.
 Sheffield Gage Corp., Dayton, O., gages, \$5729.55.
 Shipley, W. E., Machinery Co., Philadelphia, grinders, \$7905.65.
 Sperry Gyroscope Co., Brooklyn, N. Y., helmet adapters, assemblies, \$1337.50.
 Standard Spring Co., Blood Bros. Machine Co. division, Allegan, Mich., hardware, \$7555.60.
 Standard Tool & Die Corp., West Allis, Wis., gages, \$1860.
 Standard Tool Machine Co., Arlington, N. J., loading fixtures, \$3049.75.
 Sterling Products Co., Moline, Ill., screws, chucks, arbors, \$1015.
 Stewart-Warner Corp., Chicago, gages, \$7828.75.
 Swind Machinery Co., Philadelphia, hack saws, \$1463.10.
 Talon Inc., Meadville, Pa., gages, \$3678.
 Thurston Mfg. Co., Providence, R. I., cutters, \$1431.30.
 Timken-Detroit Axle Co., Detroit, assemblies, gears, \$67,848.07.
 Triumph Explosives Inc., Elkton, Md., assemblies, \$455,000.
 Tungsten Electric Co., Union City, N. J., carbide blanks, tools, \$40,300.56.
 Union Steel Chest Corp., LeRoy, N. Y., steel chests, \$76,367.16.
 United Shoe Machinery Co., Beverly, Mass., dies, \$2133.
 Universal-Cyclops Steel Corp., Bridgeville, Pa., steel rods, \$226,143.41.
 Vinco Corp., Detroit, gages, \$6854.20.
 Vulcan Crucible Steel Co., Aliquippa,

Commodity	Amount
Allegheny Ludlum Steel Corp., Brackenridge, Pa.	Steel plates \$310,915.50
American Hardware Corp., New Britain, Conn.	Locks 24,301.10
Armed International Corp., Middletown, O.	Steel culverts 36,128.25
Associated Spring Corp., Wallace Barnes Co. division, Bristol, Conn.	Operating rod springs 72,946.80
Atlas-Ansonia Co., New Haven, Conn.	Oilers 20,618.40
Bethlehem Steel Co., Bethlehem, Pa.	Bar steel, steel 34,172.13
Bohn Aluminum & Brass Corp., Detroit	Metal fuse parts 339,300.00
Briggs Mfg. Co., Detroit	Steel lavatories 92,807.00
Budd, Edward G., Mfg. Co., Philadelphia	Smoke pipes 567,862.00
California Steel Products Co., San Francisco	Mooring buoys 83,069.00
Carnegie-Illinois Steel Corp., Chicago	Steel, sheets 102,509.44
Carpenter Steel Co., Reading, Pa.	Pipe, tubing 34,971.88
Columbian Steel Tank Co., Kansas City, Mo.	Mooring buoys 91,672.06
Crane Co., Chicago	Copper nickel flanges, steel valves 55,298.60
Crucible Steel Co. of America, New York	Steel 75,947.73
Estate Stove Co., Hamilton, O.	Ranges 70,507.50
General Machine & Supply Co., San Francisco	Wrenches, steel pipe 28,319.99
Hanssen's, Louis, Sons, Davenport, Iowa	Steel cable 26,949.12
Hart Mfg. Co., Louisville, Ky.	Ranges 39,885.00
Hurd Lock & Mfg. Co., Almont, Mich.	Locks 87,863.81
Lite Mfg. Co., New York	Flyer's sustenance cases 37,896.96
Lundquist Tool & Mfg. Co., Worcester, Mass.	Reel control boxes 59,481.00
Mosler Safe Co., Hamilton, O.	Safes 48,145.09
Oliver Iron & Steel Co., Pittsburgh	Bolts, nuts 119,330.57
Peck, Stow & Wilcox Co., Southington, Conn.	Motor maintenance equipment 22,250.00
Pheoll Mfg. Co., Chicago	Screws, nuts 153,427.31
Pittsburgh Screw & Bolt Corp., Pittsburgh	Bolts, nuts 22,000.71
Presto Gas Mfg. Co., Chicago	Range parts, utensils 12,751.26
Quincy Stove Mfg. Co., Quincy, Ill.	Stove parts 25,945.25
Reed & Prince Mfg. Co., Worcester, Mass.	Wood screws 136,002.47
Republic Steel Corp., Cleveland	Steel, bar steel, bolts, nuts 193,761.13
Rhode Island Tool Co., Providence, R. I.	Stud bolts 20,653.60
Rotary Electric Steel Co., Detroit	Steel 49,369.20
Russell Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.	Bolts, nuts 31,151.31
Rustless Iron & Steel Corp., Baltimore	Steel 25,637.63
Savory Inc., Newark, N. J.	Pie plates 26,400.00
Scovill Mfg. Co., Waterbury, Conn.	Fuses 3,780,000.00
Scrimgeour, William, Washington	Knives, ladles, can openers, skimmers 43,995.05
Snap-On-Tools Corp., Kenosha, Wis.	Motor maintenance equipment 96,510.00
Standard Products Co., Detroit	Grommets 109,200.00
Stanley Works, New Britain, Conn.	Motor maintenance equipment 21,690.00
Taylor-Wharton Iron & Steel Co., Easton, Pa.	Gas cylinders 92,885.00
Timken Roller Bearing Co., Canton, O.	Bar steel, steel 37,817.43
Unique Specialties Inc., New York	Brass fuse holders 64,041.25
Universal Sanitary Mfg. Co., New Castle, Pa.	Water closet combinations 54,300.00
Upson-Walton Co., Cleveland	Blocks 20,000.00
Wallingford Steel Co., Wallingford, Conn.	Steel 49,481.83
Worcester Taper Pin Co., Worcester, Mass.	Brass fuse holders 36,300.48
Worden-Allen Co., Milwaukee	Fabricated structural steel 48,000.00
Wrought Iron Range Co., St. Louis	Ranges 41,250.00
Wyckoff Drawn Steel Co., Pittsburgh	Steel bars 115,460.00
Youngstown Sheet & Tube Co., Youngstown, O.	Zinc coated steel 43,468.84

Nonferrous Metals and Alloys

Aluminum Co. of America, Pittsburgh	Ingot aluminum alloy \$17,310.00
Aluminum Cooking Utensil Co., New Kensington, Pa.	Aluminum dish pans 130,560.00
American Brass Co., Waterbury, Conn.	Seamless brass tubing, condenser tubes, cartridge brass cups, cartridge brass bullet jacket cups 893,974.43
American-LaFrance-Foamite Corp., Elmira, N. Y.	Fire extinguishers 99,052.50
American Smelting & Refining Co., Seattle	Copper ingots 24,668.51
Bridgeport Rolling Mills Co., Bridgeport, Conn.	Gilding metal 36,120.60
Chase Brass & Copper Co. Inc., Waterbury, Conn.	Copper tubing, seamless brass tubing 24,061.81
Howes, S. M., Co., Boston	Bronze castings 33,264.12
International Engineering Inc., Dayton, O.	Marker lamp assemblies 31,350.00
Mueller Brass Co., Port Huron, Mich.	Brass rods 89,599.25
Pennsylvania Flexible Metallic Tubing Co., Philadelphia	Bronze steam hose 22,510.00
Phelps Dodge Copper Products Corp., British American Tube division, New York	Condenser tubes 146,610.00
Revere Copper & Brass Inc., Baltimore	Condenser tubes, seamless copper tubing 43,807.58

(Please turn to Page 43)

WALSH-HEALEY ACT

Machinery and Other Equipment	Commodity	Amount
Air Reduction Sales Co., New York	Tractor trucks	\$14,869.00
Alemite Co. of Maryland, Baltimore	Pressure lubricating gun fittings	59,776.50
Allen-Sherman-Hoff Co., Philadelphia	Slag handling equipment	49,732.00
American Brake Shoe & Foundry Co., Brake Shoe & Castings division, New York	Iron castings	30,922.50
American Car & Foundry Co., New York	Idler and parts	13,296.00
Anderson, Dorsey Co., Philadelphia	Welders	27,090.00
Armstrong Cork Co., Pittsburgh	Machining shell	355,334.00
Barwood & Co., Philadelphia	Gages	20,457.40
Borg-Warner Corp., Rockford Drilling Machine division, Rockford, Ill.	Clutch assemblies	59,301.70
Caterpillar Tractor Co., Peoria, Ill.	Crawler tractors	45,420.00
Cincinnati Shaper Co., Cincinnati	Press brakes	42,774.00
Clearing Machine Corp., Chicago	Presses	50,300.00
Cleveland Automatic Machine Co., Cleveland	Lathes	71,534.45
Clyde Iron Works, Duluth	Steam winches	32,630.00
Colson-Merriam Co., Washington	Electric food conveyors	14,435.25
Commercial Engineering Co., Washington	Oil purifiers, centrifugal purifiers	116,715.85
Curtis Mfg. Co., St. Louis	Air compressors	45,724.00
Denison Engineering Co., Columbus, O.	Painting, conveying equipment	26,490.00
Detroit Bevel Gear Co., Detroit	Gears	47,528.25
Dravo Corp., Philadelphia	Propelling unit parts	37,740.80
Enterprise Tool & Gear Corp., Detroit	Gears, worms	164,085.00
General Bronze Corp., Long Island City, N. Y.	Dolly assemblies	321,570.00
General Electric Co., Schenectady, N. Y.	Diesel locomotives	48,330.00
General Machinery Corp., Hamilton, O.	Rifling machines	92,335.00
General Motors Corp., Detroit	Generator sets, shell fuses, oil-air tube coolers, parts for engines	1,809,524.91
Greenfield Tap & Die Corp., Greenfield, Mass.	Drills	41,020.00
Hadley Special Tool Co. Inc., Boston	Trigger release assemblies, tools, carbon removing tools	54,306.25
Harris, R. L., Inc., Knoxville, Tenn.	Tractors, power control units	32,815.90
Husmann-Lignonier Co., St. Louis	Ice-cooled refrigerators	95,800.00
Ingersoll Milling Machine Co., Rockford, Ill.	Milling machines	175,500.00
Ingersoll-Rand Co., New York	Portable drills, air compressors	396,425.30
Jensen Mfg. Co., Palmyra, N. J.	Laundry equipment	61,018.00
Kearney & Trecker Corp., Milwaukee	Milling machines	40,496.40
Kux-Lohner Machine Co., Chicago	Tablet presses	106,390.00
Lakeside Bridge & Steel Co., Milwaukee	Gantry cranes	98,750.00
LeTourneau, R. G., Inc., Peoria, Ill.	Carryall scrapers	27,270.70
Linde Air Products Co., Baltimore	Oxy-acetylene torches	171,420.00
Lloyd & Arms Inc., Philadelphia	Engine lathes, piston ring machines, radial drills	47,543.00
Lynchburg Foundry Co., Lynchburg, Va.	Cast iron pipe	52,639.21
Maxson, W. L., Corp., New York	Range drums	20,945.00
Mine Safety Appliances Co., Pittsburgh	Tool parts	109,790.93
National Marking Machine Co., Cincinnati	Marking machines	75,600.00
Oliver Machinery Co., New York	Endless bed sanders	24,730.00
Outboard, Marine & Mfg. Co., Milwaukee	Outboard motors	65,429.52
Pennsylvania Tool & Mfg. Co., York, Pa.	Gages	23,675.00
Pettibone Mulliken Corp., Chicago	Dredge pumps	29,286.00
Pierce, F. J., Pasadena, Calif.	Outboard motors	52,090.92
Pump Engineering Service Corp., Cleveland	Test stands	30,675.00
Reiner, John, & Co. Inc., Long Island City, N. Y.	Diesel generator sets	280,286.10
Remington Arms Co. Inc., Bridgeport, Conn.	Rifles, parts	29,992.81
Seymour Products Co., Seymour, Conn.	Sub-machine gun parts	67,045.19
Sherwood Brass Works, Detroit	Diesel engine parts	65,836.40
Sparks-Withington Co., Jackson, Mich.	Bomb hoist assemblies	297,000.00
Suntoc Spring Water Co., Media, Pa.	Coolers	44,925.50
Taylor Machine Co., Cleveland	Bomb hoist assemblies	219,300.00
Taylor-Parker Co. Inc., Norfolk, Va.	Cutters, saws	28,226.67
U. S. Axle Co. Inc., Pottstown, Pa.	Dummy trucks	41,150.00
United States Motors Corp., Oshkosh, Wis.	Power units	72,555.00
Walker Mfg. Co., Racine, Wis.	Jacks	17,310.00
Warner & Swasey Co., Cleveland	Lathes	17,720.00
Warner Electric Brake Mfg. Co., Beloit, Wis.	Electric brake units	59,991.75
Warren Steam Pump Co. Inc., Warren, Mass.	Fire, bilge pumps	90,600.00
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.	Machines	71,138.00
Wellman Engineering Co., Cleveland	Gun mounts	13,181.00
Western Cartridge Co., New Haven, Conn.	Target rifles	28,047.00
Zollner Machine Works Inc., Ft. Wayne, Ind.	Diesel engine parts	32,658.00

*Estimated.

Defense Contracts

(Concluded from Page 42)

Pa., tool steel, \$1226.38.
 Washburn Wire Co., New York division
 New York, wire, \$1012.96.
 Waterbury-Farrel Machine Co., Waterbury, Conn., tools, \$1701.
 Watson-Stillman Co., Roselle, N. J., hydraulic presses, \$3150.
 Wayne Pump Co., Ft. Wayne, Ind., artillery materiel, \$7560.
 Weinstein, S., Supply Co., New York, hardware, \$1340.22.
 Weldon Tool Co., Cleveland, tools, \$8064.
 Wledeman Machine Co., Philadelphia, gages, \$26,113.50.
 Willard Storage Battery Co., Cleveland, storage batteries, \$10,671.50.
 Worthington Pump & Machinery Corp., Holyoke, Mass., artillery materiel, \$4,718,400.
 York Safe & Lock Co., York, Pa., artillery materiel, \$2,969,476.35.
 Youngstown Sheet & Tube Co., Youngstown, O., plate steel, \$1484.34.
 Zimmerman Steel Co., Bettendorf, Iowa, steel castings, \$2161.68.

Chemical Warfare Service Awards

Bridgeport Hardware Mfg. Corp., Bridgeport, Conn., ball pein hammers, \$701.

Medical Corps Awards

Bramhall-Deane Co., New York, dental laboratory equipment, \$13,168.
 General Electric X-Ray Corp., Chicago, X-ray equipment, \$199,517.
 Picker X-Ray Corp., New York, X-ray equipment, \$324,115.50.
 Westinghouse Electric & Mfg. Co., Westinghouse X-Ray division, New York, X-ray equipment, \$416,171.85.

Quartermaster Corps Awards

Harley-Davidson Co., Milwaukee, motorcycles, \$870,360.
 Indian Motorcycle Co., Springfield, Mass., motorcycles, \$857,000.
 Meyer Construction Co., San Francisco, at Ft. Cronkhite, California, construction and completion of temporary housing including utilities thereto, \$520,052.
 Sharon Steel Corp., Sharon, Pa., strip steel, \$1395.62.

Corps of Engineers Awards

American-LaFrance-Foamite Corp., Elmira, N. Y., fire extinguishers, \$487.68.
 Black & Decker Mfg. Co., Towson, Md., drills and grinders, \$907.56.
 Curtis Mfg. Co., St. Louis, compressors, \$241.47.
 Factory & Yard Supply Co., New York, tools, \$307.20.
 Samson United Corp., Rochester, N. Y., electric fans, \$1574.40.
 Sperry Gyroscope Co. Inc., Brooklyn, N. Y., azimuth scales, \$15,616.

Signal Corps Awards

American Automatic Electric Sales Co., Chicago, rolling ladders, \$1627.40.
 American Fork & Hoe Co., Charleston, W. Va., axes, \$1136.
 Burke Electric Co., Erie, Pa., voltage regulators, \$2100.
 Cook Electric Co., Chicago, jacks, \$940.
 Garfield Electric Supply Co., Hillside, N. J., cable, \$402.
 Graybar Electric Co., Chicago, cases, loading coils, \$34,776.70.
 Homelite Corp., Port Chester, N. Y., power units, \$1950.48.
 Kellogg Switchboard & Supply Co., Chicago, terminals, \$1836.80.
 Lauson Co., New Holstein, Wis., springs, \$467.28.
 Leich Electric Co., Genoa, Ill., rectifiers, \$894.40.
 McElroy, T. R., Boston, automatic keying units, \$7871.
 Ulmer, A. J., Irvington, N. J., tool equip-

ment, \$4704.
Western Electric Co., New York, terminal boxes, \$20,030.10.

Air Corps Awards

Abrams Instrument Co., Lansing, Mich., printer assemblies, \$29,376.
Air Associates Inc., Bendix, N. J., mooring kits, \$124,742.04.
Aircraft Accessories Corp., Siebenthaler division, Kansas City, Mo., assemblies, \$117,845.
American Chain & Cable Co. Inc., American Cable division, Wilkes Barre, Pa., cable, \$50,936.
American Gas Accumulator Co., Elizabeth, N. J., trucks, \$220,332.
American Steel & Wire Co., Cleveland, cable, \$54,757.
B. G. Corp., New York, spark plugs, \$44,855.20.
Bendix Aviation Corp., Eclipse Aviation division, Bendix, N. J., generator assemblies, starter assemblies, inverters, \$3,158,916.60; Bendix Products division, South Bend, Ind., gun charging cylinders, wheel and brake assemblies, \$411,081.80.
Bishop Wire & Cable Corp., New York, cable, \$43,650.
Blackhawk Mfg. Co., Milwaukee, jack assemblies, \$149,471.
Boeing Aircraft Co., Seattle, ammunition boxes and gun mounts, \$202,800.
Caterpillar Tractor Co., Peoria, Ill., graders, \$153,150.
Champion Spark Plug Co., Toledo, O., plugs, \$900,000.
Continental Electric Co. Inc., Newark, N. J., power plants, \$222,585.
Crescent Insulated Wire & Cable Co., Trenton, N. J., cable, \$14,750.
Crescent Tool Co., Jamestown, N. Y., pliers and wrenches, \$73,911.50.
Curtiss-Wright Corp., Curtiss Aeroplane division, Buffalo, fuselage armor plate, fuselage tanks, wing tanks and bullet-proof windshields, \$454,256; Curtiss-Propeller division, Caldwell, N. J., pro-

pellor assemblies, \$376,950.
Dodge Mfg. Corp., Mishawaka, Ind., chock assemblies, \$53,154.92.
Famco Machine Co., Racine, Wis., arbor presses, \$12,122.
General Bronze Corp., Long Island, N. Y., dolly assemblies, \$321,570.
General Electric Co., Schenectady, N. Y., generator assemblies, \$304,558.
General Motors Corp., AC Spark Plug division, Flint, Mich., plugs, \$900,000.
Goodyear Tire & Rubber Co. Inc., Akron, O., wheel and brake assemblies, \$462,447.58.
Gosiger, C. H., Machinery Co., Dayton, O., arbor presses, \$3360.
Hayes Industries Inc., Jackson, Mich., wheel and brake assemblies, \$604,606.25.
Ingersoll-Rand Co., New York, pneumatic riveting hammers, \$25,436.50.
Jack & Heintz Inc., Cleveland, starter assemblies, \$122,850.
Kinsey, E. A., Co., Cincinnati, arbor presses, \$1785.
Kline Mfg. Co., Columbus, O., windlass assemblies, \$115,880.
Larkin, M. D., Co., Dayton, O., arbor presses, \$7402.50.
Leece-Neville Co., Cleveland, generator assemblies, \$1,595,428.50.
Machinery & Specialties Inc., Dayton, O., arbor presses, \$1353.60.
Mallory, P. R., & Co. Inc., Indianapolis, shackle releases, \$108,090.40.
Mall Tool Co., Chicago, drills, \$39,375.
Mitchell Camera Corp., West Hollywood, Calif., flinder assemblies, \$60,776.02.
North American Aviation Inc., Inglewood, Calif., maintenance parts, \$792,733.19.
Okonite Co., Hazard Insulated Wire Works division, Chicago, cable, \$28,710.
Peck Stow & Wilcox Co., Southington, Conn., sheet metal machinery, \$137,584.
Rohm & Haas Co., Philadelphia, sheets, \$85,320.
Service Tool & Engineering Co., Dayton, O., instrument testing sets, \$168,990.

Sparks-Withington Co., Jackson, Mich., hoist assemblies, \$297,000.
Spriessch Tool & Mfg. Co. Inc., Buffalo, N. Y., bomb shackle assemblies, \$136,530.
Square D Co., Kollsman Instrument division, Elmhurst, N. Y., altimeter assemblies, \$666,000.
Taylor Machine Co., Cleveland, hoist assemblies, \$219,300.
Thompson Products Inc., Cleveland, fuel pumps, \$367,905.
U. S. Electrical Motors Inc., Brooklyn, N. Y., test stands, \$59,202.
U. S. Electrical Tool Co., Cincinnati, drills, \$13,500.
United Aircraft Corp., Pratt & Whitney Aircraft division, East Hartford, Conn., generator and housing assemblies, maintenance parts, \$181,680.61.
Utica Drop Forge & Tool Co. P., Utica, N. Y., pliers, \$6890.
Varely Aircraft Corp., Dayton, O., pelorus assemblies, \$68,425.
Weaver Mfg. Co., Springfield, Ill., hoists, \$41,694.50.
Webster Electric Co., Racine, Wis., assemblies, \$71,600.
Williams, F. C., Inc., Dearborn, Mich., heating units, \$59,098.80.
Wilson, K. R., New York, arbor presses, \$15,128.
Zahn Equipment & Supply Co., Columbus, O., arbor presses, \$631.80.

Navy department reported the following:

Bureau of Supplies and Accounts Awards

Allegheny Ludlum Steel Corp., Brackenridge, Pa., corrosion-resisting sheet steel, \$16,401.62.
American Brass Co., Waterbury, Conn., copper-nickel-alloy condenser tubes

(Please turn to Page 113)

Father and Son Team Up on Inventions; Patent Over 100 Fastening Devices

More than 100 United States and foreign patents on fastenings for the mass production industries are held by Albert H. Tinnerman and his son, George A. Tinnerman, of Tinnerman Products Inc., Cleveland. Nearly 50 additional patents are pending and new applications are being filed almost weekly.

The senior Tinnerman invented the original "Speed Nut" which first was used in the assembly of porcelain enameled stoves and ranges. The son concentrates on inventions based on this principle.

All Tinnerman-invented fastening devices replace two or more parts, reduce weight an average of 60 per cent, stop loosening from vibration and reduce assembly time and costs more than 50 per cent. They include spring tension devices for fastening component parts of automobiles, radios, refrigerators, stoves, ranges, heaters, trucks, toys, furniture, aircraft, washing machines, and other products.

Because of the importance of speed in aircraft constructions the Tinnermans have been called to leading plants to help step up assemblies.

Geometrically, the devices are



George A. Tinnerman



Albert H. Tinnerman

rectangular, round, square, Z-shaped, W-shaped, U-shaped and scores of other irregular shapes. They are an improvement over threaded nuts as they catch instantly. Many are self-retaining in that they hold themselves in place for blind bolting.

Special designs hold fenders to bodies of trucks and motor cars,

tops to electric refrigerators, radio coil forms to chassis, knobs to shafts of all kinds, porcelain panels to wall structures, thermostat bulbs to cooking ranges. One type is used to assemble the sealed beam headlight. Another type serves as a fastener and contact clamp in an electric range, all in one piece, facilitating assembly.

Activities of Steel Users, Makers

■ W. BINGHAM CO., Cleveland, wholesale hardware, founded in 1841, has issued a brochure sketching progress during its first century. Illustrations reproduce advertisements and documents of nearly a century ago, followed by views of the present plant and warehouse stocks.

John B. Varick Co., Manchester, N. H., and M. B. Barkan Co., Milwaukee, have been appointed distributors by General Electric Co. for its line of heating devices. The latter company will also continue as distributor for G-E electric clocks.

General Electric Co. has established a new metropolitan distributing branch with headquarters in the General Electric building, 570 Lexington avenue, New York. The new branch will distribute products of the company's air conditioning and commercial refrigeration department at Bloomfield, N. J., as well as products of the radio and television and of the appliance and merchandise departments at Bridgeport, Conn. Earle Poorman has been named manager of the metropolitan distributing branch, and will also continue as district manager of appliance sales in New York.

Pittsburgh Equitable Meter Co., Pittsburgh, has purchased the National Meter Co., Brooklyn, N. Y., thereby bringing together under one management facilities of two of the country's oldest meter manufacturers. National Meter plant will be operated as a division of the Pittsburgh company. No change is contemplated in personnel.

Cooper Alloy Foundry Co., Elizabeth, N. J., maker of alloy steel castings, valves and fittings, has acquired 20,000 square feet of buildings on five and one-half acres of land in Hillside, N. J. The buildings and property were purchased from the Breen Iron Works to handle rapidly expanding business for national defense.

John McWilliams & Sons, Jersey City, N. J., are installing equipment in the plant formerly occupied by International High Speed Steel Co., Dover, N. J., to produce steel forgings.

Patterson Foundry & Machine Co., East Liverpool, O., is moving its New York offices from 117 Liberty street to the RKO building, Rockefeller Center.

G. S. Rogers & Co., Chicago, processing materials firm, has appointed

ed Gordon A. Webb Organization, Detroit, distributor of G-S-R specification products used in the heat treatment and finishing of metals.

Chicago Rawhuc Mfg. Co., Chicago, manufacturer of machine packings, gaskets and diaphragms, has completed a 20,000 square foot addition costing \$130,000, including equipment. Major portion of space is being used for production of synthetic rubber products.

Cutler-Hammer Inc., Milwaukee, has moved its Indianapolis sales office to larger quarters at 241 North Pennsylvania street. G. E. Hunt, sales engineer, is in charge of that office.

MEETINGS

Feature British Defense Methods at Safety Congress

■ Safety engineering techniques, perfected in England and adapted to the American defense program, will headline sessions devoted to heavy metal industries, construction and manufacturing, at the twelfth annual Safety Congress and Exposition, Hotel Pennsylvania, New York, April 23-25.

First public reports will be made on some of the British defense methods, and recommendations for American practice will be based on studies by military men and safety experts here and in England.

The program schedules 52 sessions, 200 speakers, and more than 100 exhibitors of safety equipment.

Conference on Packaging Scheduled for April 1-3

Eleventh annual packaging conference of the American Management Association will be held in Hotel Stevens, Chicago, April 1-3. Twelve papers will be presented. New package designs, materials, and methods will be exhibited.

Export Managers Club of New York To Meet March 25

Twenty-first annual meeting of the Export Managers Club of New York Inc., will be held in Hotel Pennsylvania, New York, March 25. It will be an open forum on foreign trade. Three group luncheons at noon and a banquet in the evening are scheduled.

Machine and Tool Show Opens In Detroit March 24

A majority of the exhibits by

250 companies at the National Machine and Tool Progress Exhibition this week in Convention Hall, Detroit, will be in operation. American Society of Tool Engineers, sponsor, will hold its annual convention at the same time. Annual dinner will be held Friday in Book Cadillac hotel. For program and details see STEEL, March 17, p. 87.

Chicago Traffic Club Will Install New Officers

Traffic Club of Chicago will hold its thirty-fourth annual dinner in Palmer House, Chicago, at 6:30 p.m., March 27. New officers and directors, to be elected during the afternoon, will be installed.

Coal Operators To Convene In Cincinnati April 28

G. B. Harrington, president, Chicago, Wilmington & Franklin Coal Co., Chicago, will be chairman of the eighteenth annual coal convention and exposition of the American Mining Congress, in Music Hall, Cincinnati, April 28-May 2.

Galvanizers To Hold Spring Convention in Pittsburgh

Annual spring meeting of the Galvanizers Committee will be held in William Penn hotel, Pittsburgh, May 1-2. Plants will be inspected the first day and the annual dinner is scheduled for the evening. Papers and discussions will be presented the second day. D. A. Russell, Youngstown Sheet & Tube Co., Campbell, O., is chairman of the program committee.

Convention Calendar

March 24-29—**American Society of Tool Engineers.** Fourth annual convention and machine and tool progress exposition, Convention hall, Detroit. Ford R. Lamb, room 428, Boulevard Temple building, Detroit, is executive secretary.

April 2-4—**International Acetylene Association.** Forty-first annual convention at Netherland Plaza hotel, Cincinnati. Indefinitely postponed.

April 7-11—**American Chemical Society.** Municipal Auditorium, St. Louis. Dr. C. L. Parsons, 728 Mills building, Washington, is secretary.

April 14-16—**Machine Tool Electrification Forum.** Sixth annual meeting, Westinghouse Electric & Mfg. Co., E. Pittsburgh.

April 16-19—**Electrochemical Society Inc.** Seventy-ninth annual meeting at Cleveland hotel, Cleveland. Dr. C. G. Fink, Columbia University, 3000 Broadway, New York, is secretary.

April 17-18—**Porcelain Enamel Institute.** Tenth annual meeting at French Lick Springs hotel, French Lick Springs, Ind. Charles S. Pearce, 612 N. Michigan avenue, Chicago, is managing director.

April 23-25—**Concrete Reinforcing Steel Institute.** Seventeenth annual meeting, The Homestead, Hot Springs, Va. H. C. Delzell, 228 N. LaSalle street, Chicago, is executive secretary.

Reports to Stockholders, Employees Simplified

■ Increased trend toward simplification and humanization of companies' annual reports is evident from copies received by STEEL from many iron and steel producers and consumers. Definite effort is being made to present reports in such form laymen will experience no difficulty in interpretation.

Employees as well as stockholders are being sent copies of the reports. Charts, cartoons, graphs, diagrams and other pictorial methods of presentation of important data have been devised to simplify and illustrate purely statistical information.

Farrel-Birmingham Co. Inc., Ansonia, Conn., recently published a novel and representative form of report on 1940 operations. Source of company income and the two broad divisions of expenditure were explained in simplest terms. Graphic illustrations were employed to show how payments to others absorb a higher percentage of sales income than employees usually appreciate; and how employees' wages

and salaries absorb the greater portion of the remainder. A chart and accompanying explanation are used to indicate the increase in tax burden relative to sales and business profits before taxes.

Photo on Dividend Check

Acme Steel Co., Chicago, keeps stockholders informed about its products by attaching a photograph of one of its articles to each dividend check. Brief comment accompanying the photograph presents information concerning the article illustrated.

Less-Carload Freight Data Pamphlet Issued

■ "Merchandise Facts," illustrated pamphlet presenting a collection of little-known data about less-carload freight service was recently issued by the Pennsylvania railroad.

Pamphlet reports the Pennsylvania provides direct movement for less-carload merchandise over 2575 routes without intermediate rehandling each day. Average shipment

weighs 462 pounds and is carried at 76 cents per hundred.

Less-carload freight consists of "merchandise of every type, shape and description." It produces 10 per cent of the Pennsylvania's freight revenue, yielding \$33,000,000 in 1939. This was more than earnings from three important classifications of carload traffic: Products of agriculture; animals and their products; and products of forests.

Foundry Equipment Index Off in February

■ Foundry Equipment Manufacturers' Association, Cleveland, reports index of net orders closed for new equipment in February was 295.9, compared with 301.8 in January. Index for repairs was 236.6 in February and 235.8 in January. Total sales index was 281.1 in February and 285.3 in January.

Indexes are per cent of monthly averages of sales to metalworking industries, 1937-39. Practical comparison on the old base, 1922-24, can be determined by multiplying the new base figures by 1.328.

40,000-Horsepower Electric Motor To Create Great Wind

■ An electric motor of 40,000 horsepower?

Incredible as it may seem, such a motor is to be installed in the world's largest, high-speed wind tunnel now being constructed at Wright Field, Dayton, O., for the United States Army air corps.

The motor will weigh 249,000 pounds, and will drive two 40-foot fans in tandem. The drive shaft

alone will weigh 66 tons. Auxiliary motors and generators will reclaim and feed back some power to the main motor.

Contract for the large motor was awarded Westinghouse Electric & Mfg. Co., after competitive bidding.

The test chamber section will be 20 feet in diameter with a maximum air speed of 400 miles per hour.

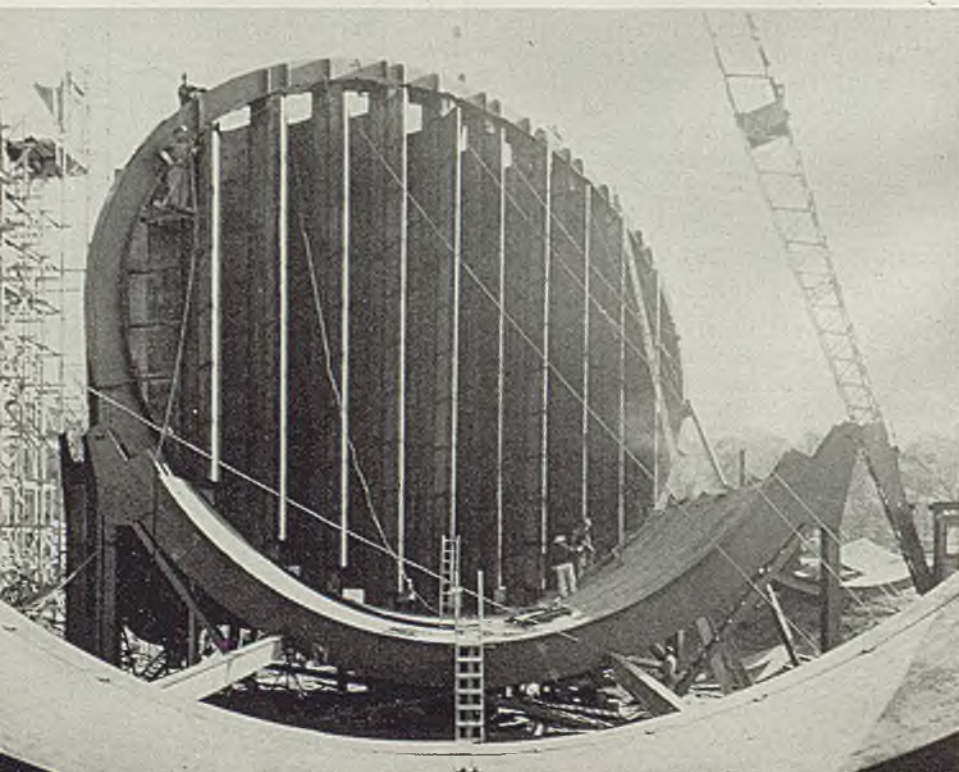
Materiel Division engineers will

be able to test units and assemblies under conditions closely paralleling the air forces encountered in flights at high speeds, as the tunnel will be large enough to take full-size fuselages, cowlings, canopies, nacelles, and propellers.

When new and untried arrangements of military airplanes are suggested, their worth can be determined in advance and included in the type specifications for procurement purposes. Also, by using larger models of military airplanes, exterior parts can be reproduced with greater accuracy and in greater detail so that materiel division engineers, able to use models up to 15 feet in width in the new wind tunnel, will get fuller data in tests than can be obtained in the 5-foot tunnel now used.

The tunnel tube, circular in cross section, extends around the four sides of a rectangle to form a circuit one-seventh of a mile. Its maximum diameter is 45 feet. It is constructed of ordinary carbon steel plates $\frac{3}{8}$ -inch thick. The largest plates used are 10 by 24 feet. About 700 tons of plates and other structural members were used in the tunnel tube.

A test chamber is constructed around the tube on one of the long sides of the rectangle. An adjacent building will house the 40,000-horsepower motor.



TRAINING 60,000 YOUNG MEN for EMERGENCY DEFENSE JOBS

DETROIT

■ ONE of the largest workmen training programs in the history of American industry is being conducted by General Motors Corp., to provide in a minimum of time additional manpower for national defense production.

"By the time we are running 'in high' on our defense orders, we expect to require a trained manufacturing personnel upward of 60,000 men," said C. E. Wilson, president.

Key factor in this rapid-fire type training program is that trainees are taught specific operations only. Instruction periods are short, turnover is large. The system is an emergency method separate from the corporation's long-range apprentice program designed to produce all-around mechanics and craftsmen.

The offensive against a skilled labor shortage is being carried on simultaneously in 40 of the corporation's plants, with the General Motors Institute at Flint, Mich., serving as general staff and quartermaster's department. Directing the campaign is B. D. Kunkle, vice president in charge of personnel.

"Lathe operators, milling machine men, drill press hands, welders and tool grinders; set-up men, foremen, technicians—even instructors themselves — are undergoing

General Motors supplements long-range apprentice plan with rapid-fire method of teaching workers for specific operations . . . Largest industrial project of its kind in American history . . . Functions in many divisions

intensive training in this gigantic educational effort. Assistance is also given to the Army and Navy in teaching men to service the defense products General Motors makes," Mr. Kunkle stated.

Most of the trainees are young,



■ Most of the students below will be "set-up" men in charge of small groups of operators when the new machine gun plant of General Motors AC Spark Plug division at Flint, Mich., gets into full production later this year. They now are learning by the "on the job" method of training how to make machine gun covers

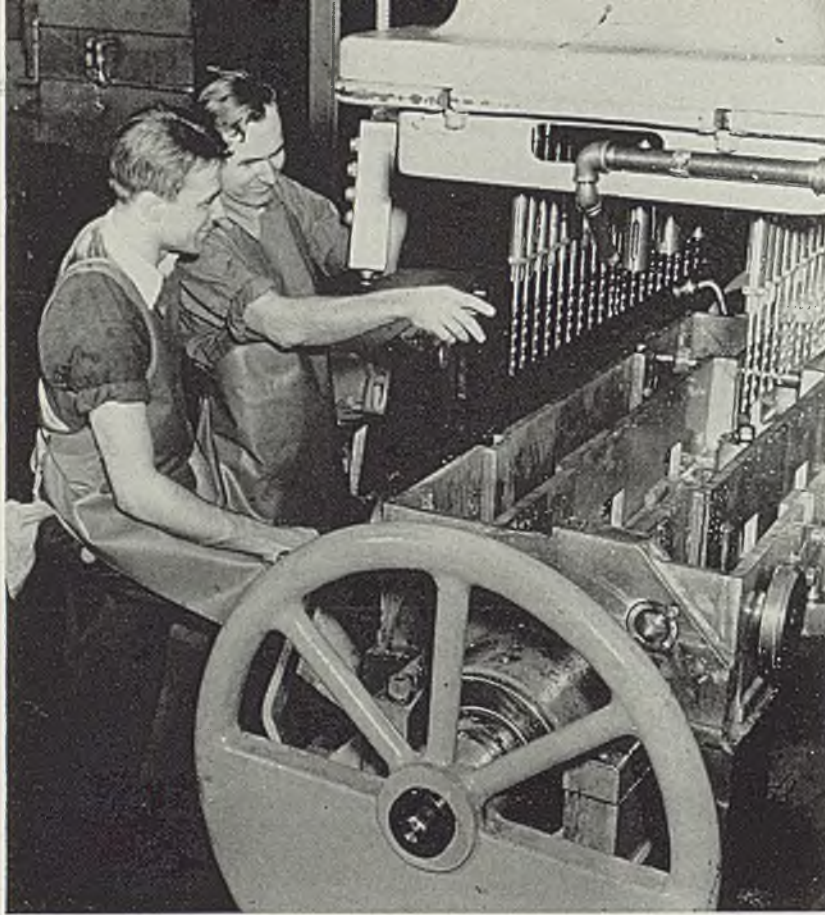
ranging in age from 18 to 25, and a majority are without prior experience in industry. Those with some high school shop training are given preference.

General practice in initiating a defense project has been to start with experienced men drawn from regular production departments. They form the nucleus of the defense department. Trainees are put in to work with them, and other trainees replace them in the regular departments. A case at the Delco-Remy division in Anderson, Ind., which recently began to machine aluminum pistons for Allison airplane engines, illustrates how the system works.

Largest single training project according to the survey, is that at Allison, just outside Indianapolis. A year ago 1500 men were on the payroll. Today the total is more than 8000, of whom about half were given instruction as trainees. New trainees now are going into the plant at a rate that soon will exceed 100 a week.

Methods of training used in the 40 plants working on defense orders vary to fit local needs and problems. In some plants trainees are taught "on the job," working either as assistants to an experienced operator or alone on a machine under the general supervision of a





■ Skilled operator shows a trainee at the Allison Division how to drill the split line on an airplane engine lower crankcase with a multiple drill



and supervise them in the shop the rest of the time.

Pending completion of a new plant, Saginaw is conducting its training activities seven days a week in a reconditioned warehouse. In addition to operators it is training 120 men, many of them drawn from its regular departments, for supervisory positions on the machine gun operation.

Many plants encourage trainees to take "related training" courses on their own time in such subjects as blueprint reading, shop mathematics and use of precision instruments; several plants, among them Allison, provide instructors and classroom facilities for these courses. Some divisions, notably AC in Flint and New Departure in Bristol and Meriden, Conn., work closely with local education authorities in setting up pre-employment shop courses in the schools. And one associated company, Yellow Truck & Coach Mfg. Co., Pontiac, Mich., has established a satisfactory relationship with local CCC camps.

set-up man. Allison has trained about 3700 men by the former method, while the AC Spark Plug Division in Flint, Mich., is adopting the latter for the 3000 workers who will man its machine gun plant.

Under both methods jobs are broken down into component parts so that trainees can be started on simple operations. Those that show promise are "upgraded" to more complex machines to make way for new trainees at the bottom. Another General Motors training method utilizes the "vestibule school," by means of which trainees are given preliminary instruction on machines set aside for that purpose before they enter a manufacturing department. Hyatt Bearings Division is training some of its defense workers this way.

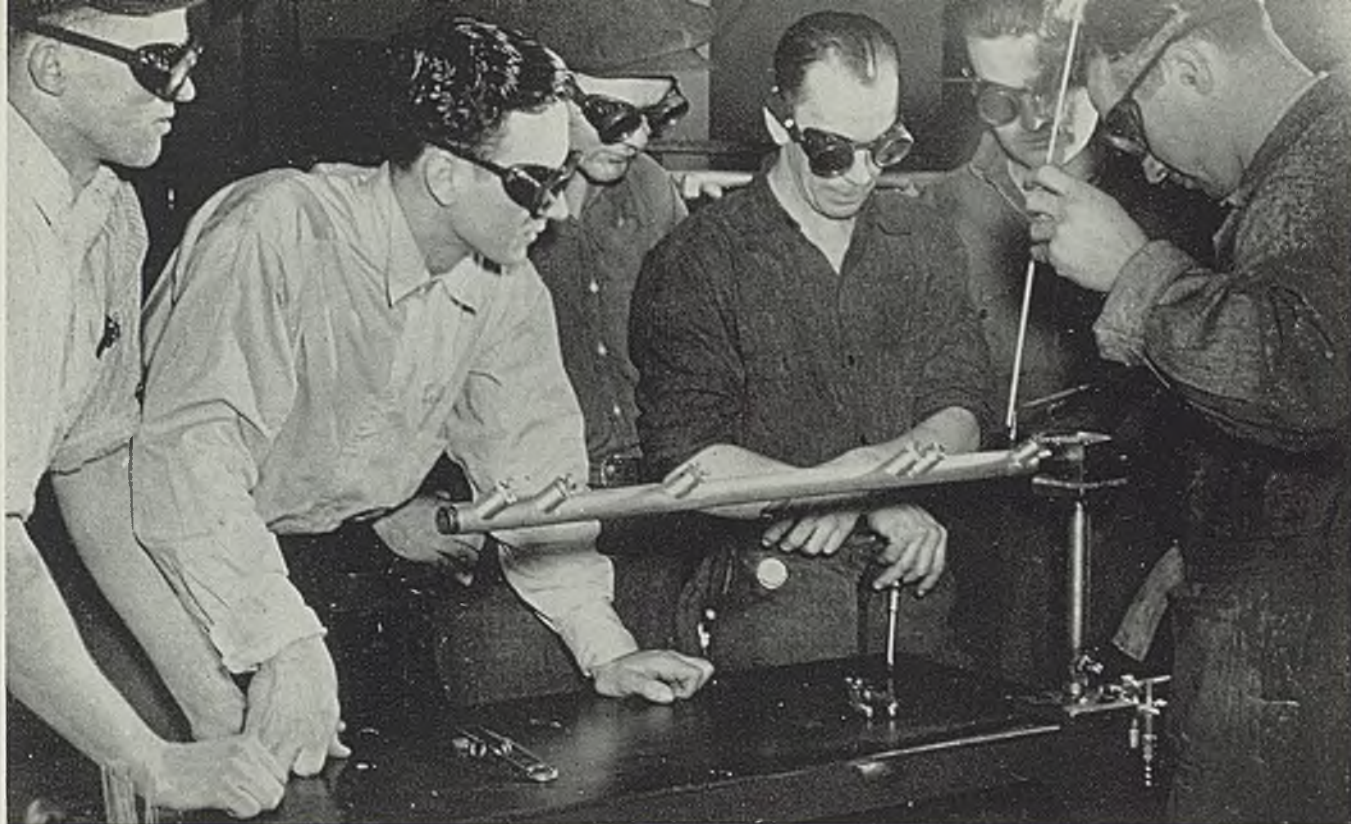
The Saginaw Steering Gear Division in Saginaw, Mich., which has

a large machine gun order, is instructing its new workers by the "group" method. Small groups of trainees are placed under individual instructors who give their charges one hour of classroom work a day



■ Three weeks before these pictures were taken, this youth was working on his father's farm. General Motors gave him an intensive training course in its Delco-Remy plant and he now is checking Allison airplane engine pistons





■ Instructor shows novices how to weld an outlet to the main ignition tube of an airplane engine at GM's Packard Electric Division, Warren, O.

The Cadillac Motor Car Division in Detroit, manufacturing Allison parts, has evolved a unique training method under which new, inexperienced workers are given jobs in what the older men in the plant call "Boystown." This is a department devoted to the hand-shaping and polishing of parts, a simple operation but one that is new to the automobile industry. About 400 youths from 18 to 25 work in this "feeder" department.

Training of set-up men, foremen and supervisors is also an important part of the GM program and is carried on largely by field instructors from the institute. More than 1500 men are being given supervisory instruction at present.

GM Institute is the mainspring of the corporation's defense training program. Not only is it training 13,000 men directly in an expanded program which keeps its shops and classrooms open day and night but its 21 years of experience and its development of tested training methods have provided a sturdy framework for meeting such an emergency as the present one.

Another large training activity will get under way when the Buick Motor Division moves into its projected airplane engine plant in the Chicago area. About 10,000 workers will be employed in the plant, and the division is working with trade and technical schools in Chicago on a co-operative program.

Another type of General Motors training work is illustrated at the Cleveland Diesel Engine Division

plant where squads of engine room "gobs" from the Navy are put through a six-week course on diesel engine design, operation and servicing. A similar course for Army pilots and mechanics and Allison mechanics and field service men is given at Indianapolis.

Streamlined Short-Term Training Courses Tried by General Electric

■ Practical, streamlined, short-term courses in which men are trained in several weeks to do one specific job are the partial response of General Electric Co., Schenectady, N. Y., to the increasing demand for skilled and semi-skilled labor.

In General Electric plants, hundreds are learning to run lathes, milling machines, drill presses, and grinders. Others are learning to read blueprints and perform simple assembly jobs, according to G. H. Pfeif, personnel director under the vice-president in charge of manufacturing.

The short-term courses, however, comprise only one means by which the company is attempting to meet defense labor demands. At all plants, General Electric is co-operating with city vocational schools in presenting specialized courses.

To Schenectady have come older men from the Erie, Pa., and Pittsfield, Mass., works to learn details of turbine manufacture. Simultaneously, the four-year apprentice training program has been contin-

ued in the company's nine major plants, with 1015 undergoing training currently.

Extent of the short-term training program is limited only by available facilities, Mr. Pfeif said. Thousands have applied for training, and the problem is one of selection rather than recruiting.

Men residing within convenient distance of the various plants are selected, primary consideration being given to their mechanical aptitude or interest. Other factors being equal, preference is given those who have had machine shop experience in industry or in vocational or federal training schools. Each prospective trainee must be at least 21 years old.

Majority of trainees are assigned to machine tool operations, although many are placed on assembly work.

1,000,000 Will Receive Defense Vocational Training by June 30

Defense vocational school training is well ahead of schedule, according to John W. Studebaker, United States commissioner of education, Washington. Reports from all states indicate that about 1,000,000 will be trained for defense industries by June 30, 1941. Original plans provided for training of about 700,000 by June 30.

More than 325,000 were trained or in training by Jan. 1, with the program continually enlarging. Of 900 cities with vocational trade and

industrial schools, 800 are making their facilities available for defense training. Vocational schools in more than 300 cities are on a 24-hour, six day week schedule.

Approximately 2,000,000 are enrolled in the regular vocational education program, an all-time high. Large proportion of occupations for which they are being trained is reported directly useful in defense.

Trade and industrial education alone enrolls more than 750,000, including many apprentices who attend part time. In these courses, basic and related training in defense-vital skills as pattern-making, welding, sheet metal, drafting, machine shop, electricity and auto mechanics are offered.

More than 3,000,000 will be served by various vocational education courses in the coming year, said Mr. Studebaker.

February Bookings of Electric Trucks at Peak

■ February electric truck and tractor bookings were 478 units, largest in the industry's history, according to the Industrial Truck Statistical Association, 208 South LaSalle street, Chicago. Month's aggregate was an increase of 505 per cent over February, 1940, bookings, compared with 261 units in January.

Total net value of chassis booked

was \$1,441,521.50, an increase of 399 per cent over value of bookings in February last year. Total in January was \$389,441.

Chassis bookings last month included: Nonelevating platform trucks, 81 units valued at \$146,305; cantilever trucks, 306 units valued at \$954,311.50; heavy and light duty tractors, 38 units valued at \$69,825; cranes, 52 units valued at \$265,330; and one special unit valued at \$5,750.

Detailed information may be obtained from the association.

Record Power Expansion Scheduled for 1941-42

■ Proposed expansion of generating capacity in 1941 and 1942 should supply any increased needs for electric power occasioned by the defense program, H. S. Benion, managing director, Edison Electric Institute, said last week.

Installed capacity at the end of 1940, he explained, exceeded demand by 32 per cent. New construction is expected to maintain that margin.

Present schedules call for installation in 1941 and 1942 of 6-

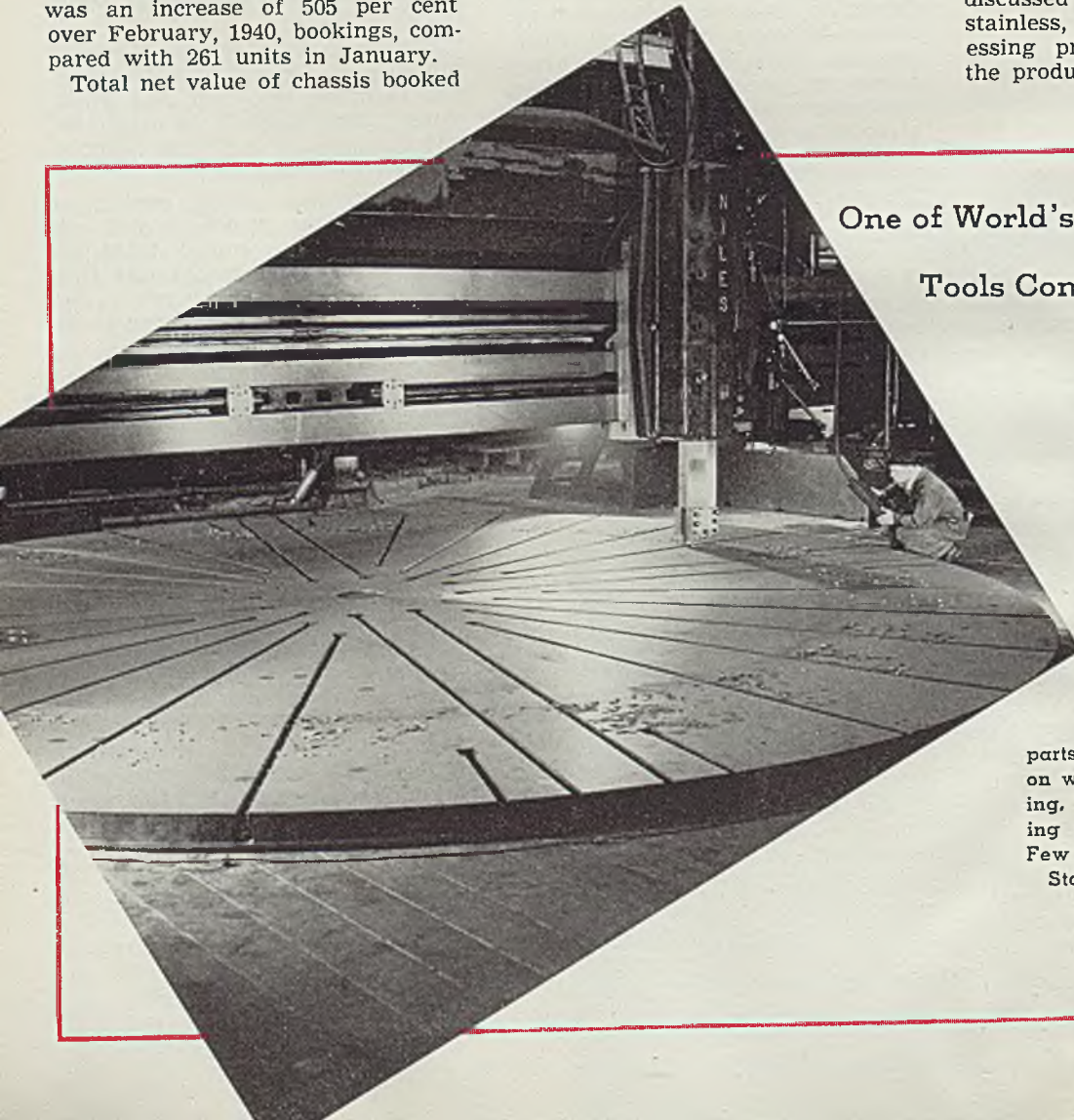
715,000 kilowatts of new generating capacity, approximately 30 per cent greater than was ever installed in any previous two-year period.

Stainless Steel Output 200,000 Tons in 1940

■ Production of stainless steels in 1940 is estimated as 200,000 tons, representing a value of \$80,000,000. These figures were cited by Stanley P. Watkins, manager, developments division, Rustless Iron & Steel Corp., Baltimore, in addressing the Chicago chapter, American Society for Metals.

This large tonnage, a substantial increase over 1939, the speaker declared, indicates the constantly increasing acceptance and expanding applications for the material. Mr. Watkins described the manufacture of stainless in his plant, a process which is essentially different than followed in most plants. Practice there is to start with chrome ore as the base material and to reduce it in the electric arc furnace. To this is added steel scrap, and subsequently nickel for certain grades.

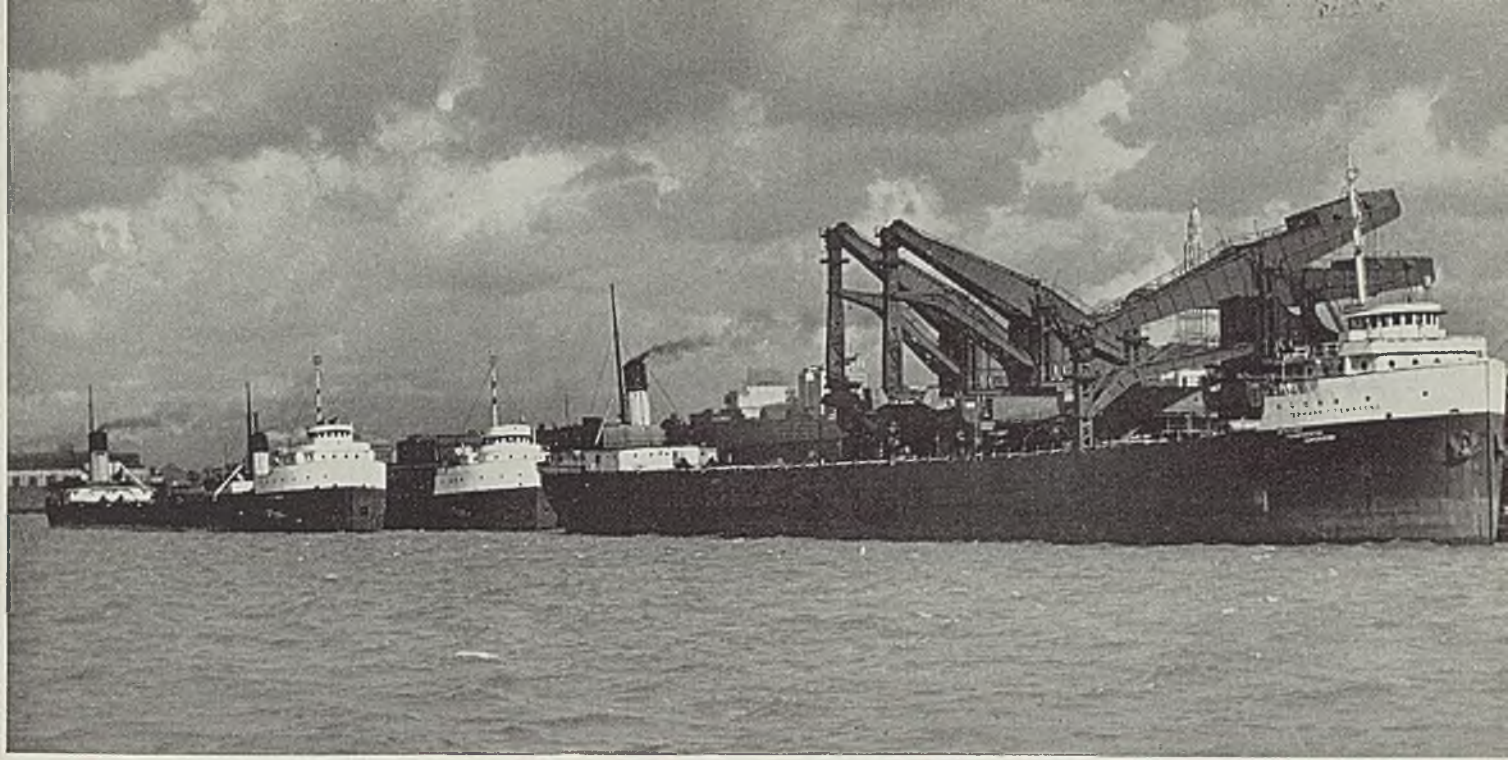
Principal finished products of the Baltimore plant are bars and wire, although ingots, billets, slabs and sheet bars are sold. Mr. Watkins discussed the various grades of stainless, manufacturing and processing procedure, fields in which the products are used.



One of World's Largest Machine

Tools Completes Itself

■ This giant vertical boring mill for Westinghouse Electric & Mfg. Co.'s East Pittsburgh works is here shown taking a final leveling cut across its 30-foot diameter work table, prior to being placed in active service. The revolving table is capable of handling electrical generator parts and various other heavy equipment parts weighing up to 200 tons, on which surfacing and flanging, boring and outside turning operations are required. Few boring mills in the United States are as large as this



■ **FLEET WITHOUT GUNS:** Awaiting the opening of the Great Lakes navigation season are 291 ore carriers, a fleet as essential to United States security as the warships in the Pacific and the Atlantic. During coming months they are expected to transport a record tonnage of iron ore, from which will be fashioned the implements of defense

SHIPPERS READY FOR RECORD ORE MOVEMENT

■ **ICE CONDITIONS** at the head of the Great Lakes are being watched with unusual interest this spring by shipping officials and steelmakers, faced with the need for moving a record tonnage of iron ore during the season.

Practically the entire fleet will be placed in service as soon as weather conditions permit. They are expected to operate at capacity until winter's storms close the season.

Granted a reasonably early opening and a fair November, the fleet will carry 72,000,000 to 73,000,000 gross tons of ore to lower lake ports, easily a new peak. Present record movement by vessel is 65,205,000 gross tons in 1929.

Shippers' present plans indicate the 1941 fleet will include 291 vessels, or seven less than were available last season. The reduction is caused by losses in last November's severe storms and by sales. Two vessels intended for sale to Canadian interests may be retained in the American ore trade, raising the total to 293. Several other small vessels which have not been active may be called into service, but the total carrying capacity that would thus be added is not considerable. Two ore carriers are being built for Pittsburgh Steamship Co.,

United States Steel Corp. subsidiary, but these may not be ready for service until 1942.

Carrying capacity could be increased if Canadian vessels were permitted to enter the United States coast-to-coast service. Such action by the government, however, would have numerous dislocating influences on lake shipping and United States interests hope it will not become necessary.

Ore consumption in recent months has been averaging slightly more than 6,000,000 tons a month, indicating the estimated shipments for 1941 season will just about provide the amount needed to May 1, 1942, assuming steelworks operations continue at practical capacity.

Stocks Diminishing Rapidly

February consumption was 5,673,166 tons, compared with 6,331,018 tons in January. The decrease was caused by the shorter month and a slightly lower blast furnace rate.

Stocks on hand at furnaces and Lake Erie docks March 1 totaled 24,195,165 tons. Prospects are that half of these stocks will be used during March and April, leaving approximately 12,000,000 tons on hand May 1. This is considered a small reserve and considerably under

normal. On May 1, 1940, stocks were 18,106,000 tons, and on May 1, 1939, they were 22,790,000 tons.

Some shippers already have announced appointments of principal officers for their ships. The personnel problem is not expected to cause undue difficulty. Selective service boards have granted deferments liberally to licensed men of the Great Lakes service and in many cases also have deferred able bodied seamen.

Ore mine operators in the Lake Superior district have been active during the past winter preparing for the anticipated record demand. Mining equipment, rolling stock of the ore railroads and docks have been repaired. Some iron mines that have not figured in the shipping list for 10 or 15 years will reappear in 1941. This has necessitated extensive preparations in mine stripping and installation of new equipment.

Variable winds and the darkening of ice fields last week led some shippers to anticipate an early opening of navigation. The average opening at Duluth-Superior is about April 21. Earliest openings were April 6 in 1902, and April 7 in 1931. However, in 16 years between 1883 and 1940 the season opened between May 1 and May 14.

History Repeats, Finding Labor

Peace Vital To Winning Any War

■ In creating the National Defense Mediation Board, President Roosevelt has gone a long way toward repairing the damage done by his persistent tendency to minimize the extent of current labor disturbances.

In broad outline the new board resembles the National War Labor Board formed by President Wilson on March 29, 1918. However, there are a few differences, some of which may prove to be significant.

♦ ♦ ♦

President Wilson's war labor board consisted of 12 members—two for the public and five each for employers and employees. President Roosevelt's board has 11 members—three representing the public, four the employers and four the employees.

Numerically the public interest has stronger representation on the new board than on the 1918 body.

Labor's representation probably is more aggressive—individual for individual—than that of the earlier board. However, the influence of the voice of labor among the Roosevelt appointees is weakened by the lack of harmony which prevails. (Two are from the ranks of A. F. of L. and two are from C. I. O. organizations).

While management has four representatives on the new board in contrast to five on the old, its interests should fare no worse nor better than in 1918.

♦ ♦ ♦

The functions of the 1941 board, as defined by the President's executive orders are surprisingly similar to those outlined by President Wilson for the 1918 tribunal. They differ only in minor detail.

For instance, Mr. Roosevelt's board is

authorized to appoint an arbiter in case the disputants cannot agree. In 1918, if the decision of the 12-man board was not unanimous, the case was carried to an umpire appointed by President Wilson.

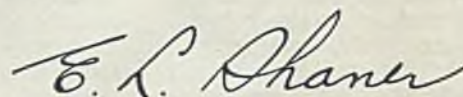
Another difference, which may prove to be important, is that President Roosevelt's executive order provides that certain issues involving the determination of labor's representatives for collective bargaining can be put up to the National Labor Relations Board. It remains to be seen whether or not this device will be effective in handling jurisdictional disputes.

♦ ♦ ♦

But the main point is that machinery now has been set up to deal with labor stoppages which, notwithstanding the administration's repeated assurances that they were unimportant, actually were becoming a serious menace to the success of the defense program.

In his address on March 15, President Roosevelt said, "Let me make it clear that the nation is calling for the sacrifice of some privileges but not for the sacrifice of fundamental rights. Most of us will do that willingly."

Acting within the range of this policy, the new National Defense Mediation Board should be able to put an end to senseless bickering. The public interest demands harmony. The board can achieve it without encroaching upon the basic rights of employers or employees.


EDITOR-IN-CHIEF

The BUSINESS TREND



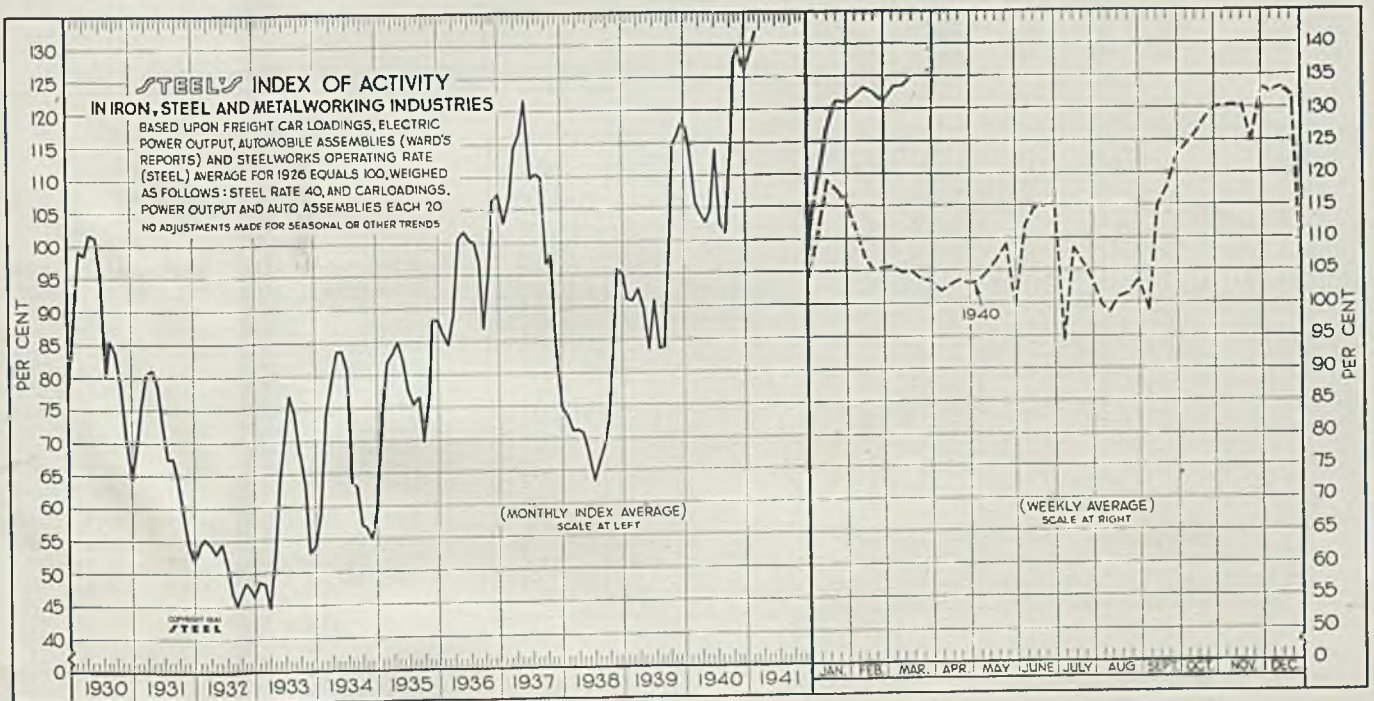
Activity Index Climbs To New Peak Level

■ NEW production records, rising order backlogs and expanding consumption continue to dominate the industrial picture. With demand still exceeding output in many lines, greater interest is developing in the attempt to control or ease the tight supply situation. More intensified effort is being made to weed out speculative orders.

STEEL'S index of activity climbed to a new peak during the week ended March 15. In that period the index stood at 135, a gain of 1.9 points over the preceding week's index figure of 133.1. At this time a year ago the index was at the 104.9 level, while in 1939 and 1937 it was 93.3 and 112.7 respectively.

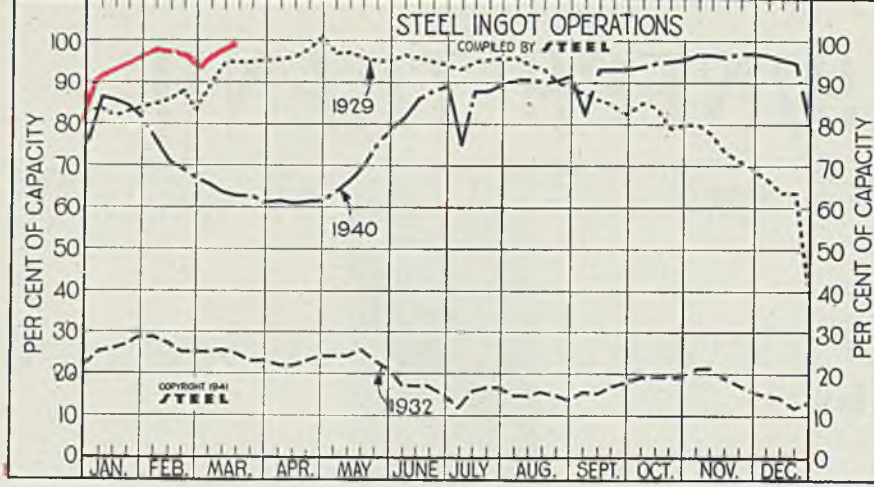
During the week ended March 15, steelmaking operations advanced to the highest level in history on a tonnage basis, and a further increase was recorded this past week. A year ago the national steel rate stood at 62.5 per cent and was tending downward. Automobile production climbed to 131,620 units during the week of March 15. This represents the best weekly total in automobile assemblies recorded since the week of May 15, 1937.

Freight carloadings gained considerably more than seasonally during the latest period to 758,693 cars. This is a new peak for this year and exceeds any like week since 1930.



STEEL'S index of activity gained 1.9 points to 135.0 in the week ended March 15:

Week Ended	1941	1940	Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan. 4	114.5	110.3	Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Jan. 11	128.2	119.2	Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
Jan. 18	130.8	117.3	March	.....	104.1	92.6	71.2	114.4	87.7	83.1	73.9	44.5	54.2	80.4	98.6
Jan. 25	130.7	115.4	April	.....	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
Feb. 1	132.0	111.6	May	.....	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
Feb. 8	132.7	107.2	June	.....	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
Feb. 15	132.3	105.1	July	.....	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Feb. 22	131.2	105.4	Aug.	.....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
March 1	133.0	105.6	Sept.	.....	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
March 8	133.1	104.7	Oct.	.....	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
March 15	135.0	104.9	Nov.	.....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
			Dec.	.....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3



Steel Ingot Operations

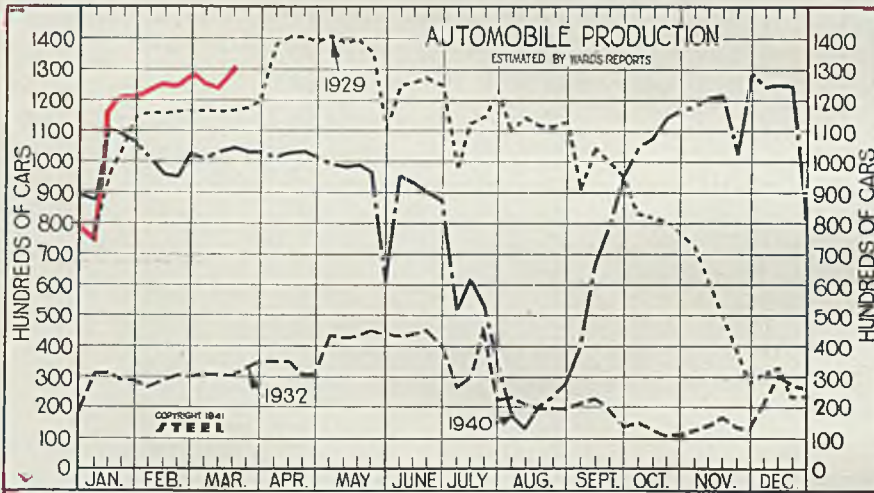
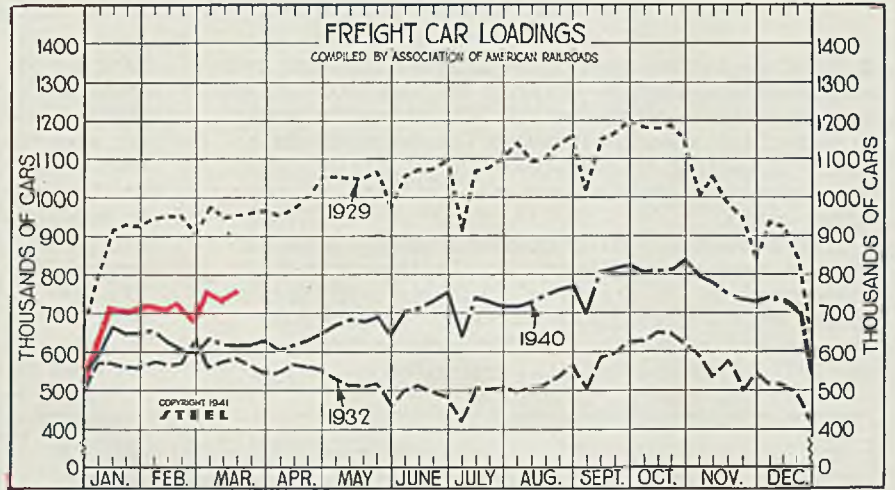
(Per Cent)

Week ended	1941	1940	1939	1938
March 15 ..	98.5	62.5	56.5	32.0
March 8 ...	97.5	63.5	56.5	30.0
March 1 ...	96.5	65.5	56.0	29.5
Feb. 22	94.5	67.0	55.0	30.5
Feb. 15	96.5	69.0	55.0	31.0
Feb. 8	97.0	71.0	54.0	30.0
Feb. 1	97.0	76.5	53.0	31.0
Jan. 25	95.5	81.5	51.5	33.0
Jan. 18	94.5	84.5	51.5	30.5
Jan. 11	93.0	86.0	52.0	29.0
Jan. 4	92.5	86.5	51.5	26.0
Week ended	1940	1939	1938	1937
Dec. 28	80.0	75.5	40.0	21.0
Dec. 21	95.0	90.5	52.0	23.0
Dec. 14	95.5	92.5	58.0	27.0
Dec. 7	96.5	94.0	61.0	27.0
Nov. 30	97.0	94.0	61.0	30.5

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
March 15	759	619	595	540
March 8	742	620	592	557
March 1	757	634	599	553
Feb. 22	678	595	561	512
Feb. 15	721	608	580	536
Feb. 8	710	627	580	543
Feb. 1	714	657	577	565
Jan. 25	711	649	594	553
Jan. 18	703	646	590	570
Jan. 11	712	668	587	581
Jan. 4	614	592	531	552
Week ended	1940	1939	1938	1937
Dec. 28	545	550	500	457
Dec. 21	700	655	574	460
Dec. 14	736	681	606	603
Dec. 7	739	687	619	622



Auto Production

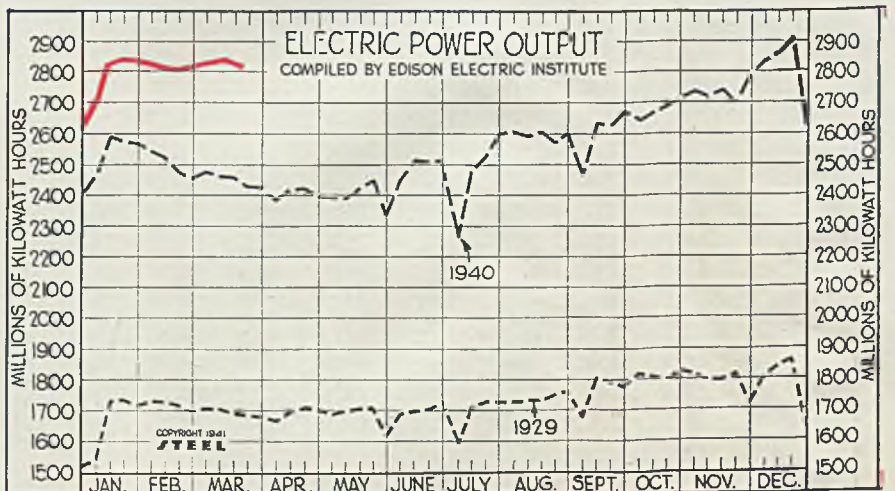
(1000 Units)

Week ended	1941	1940	1939	1938
March 15 ..	131.6	105.7	86.7	57.6
March 8 ...	125.9	103.6	84.1	57.4
March 1 ...	126.6	100.9	78.7	54.4
Feb. 22	129.2	102.7	75.7	57.0
Feb. 15	127.5	95.1	79.9	59.1
Feb. 8	127.7	96.0	84.5	57.8
Feb. 1	124.4	101.2	79.4	51.4
Jan. 26	121.9	106.4	89.2	59.4
Jan. 18	124.0	108.5	90.2	65.4
Jan. 11	115.9	111.3	86.9	65.7
Jan. 4	76.7	87.5	76.7	54.1
Week ended	1940	1939	1938	1937
Dec. 28 ...	81.3	89.4	75.2	49.6
Dec. 21 ...	125.3	117.7	92.9	67.2
Dec. 14 ...	125.6	118.4	102.9	82.0

Electric Power Output

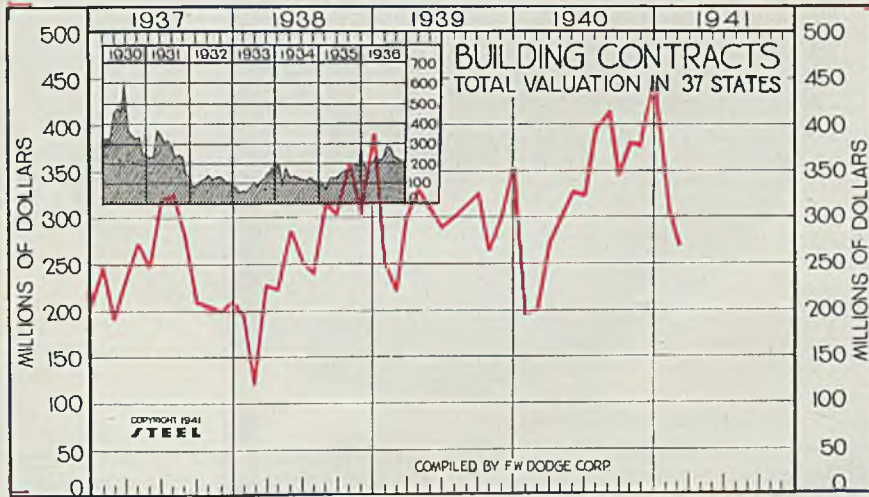
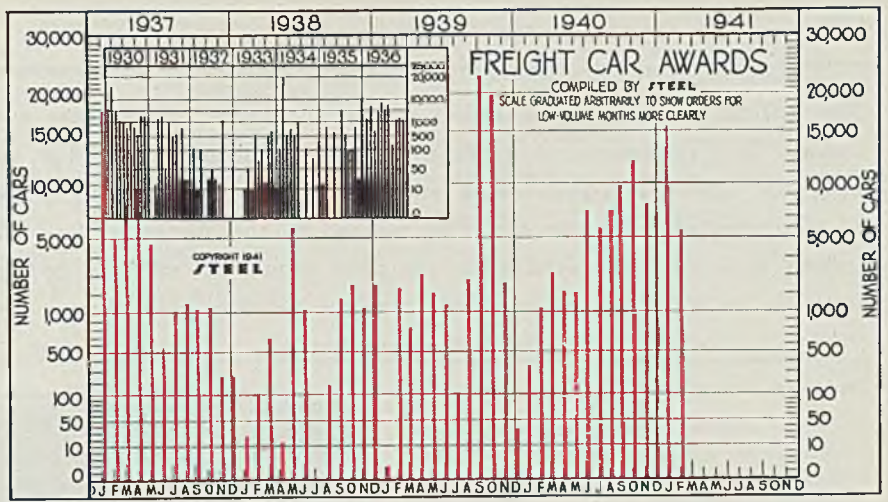
(Million KWH)

Week ended	1941	1940	1939	1938
March 15 ..	2,818	2,460	2,225	2,018
March 8 ...	2,835	2,464	2,238	2,015
March 1 ...	2,826	2,479	2,244	2,036
Feb. 22 ...	2,820	2,455	2,226	2,031
Feb. 15 ...	2,810	2,476	2,249	2,059
Feb. 8 ...	2,824	2,523	2,268	2,052
Feb. 1 ...	2,830	2,541	2,287	2,082
Jan. 25 ...	2,830	2,566	2,293	2,099
Jan. 18 ...	2,844	2,572	2,290	2,109
Jan. 11 ...	2,835	2,593	2,270	2,115
Jan. 4 ...	2,705	2,473	2,169	2,140
Week ended	1940	1939	1938	1937
Dec. 28 ...	2,623	2,404	2,121	1,998
Dec. 21 ...	2,911	2,641	2,363	2,085
Dec. 14 ...	2,862	2,605	2,333	2,202
Dec. 7 ...	2,838	2,586	2,319	2,196



Freight Car Awards

	1941	1940	1939	1938
Jan.	15,169	360	3	25
Feb.	5,508	1,147	2,259	109
March		3,104	800	680
April		2,077	3,095	15
May		2,010	2,051	6,014
June		7,475	1,324	1,178
July		5,846	110	0
Aug.		7,525	2,814	182
Sept.		9,735	23,000	1,750
Oct.		12,195	19,634	2,537
Nov.		8,234	2,650	1,232
Dec.		7,181	35	2,581
Total ...	66,889	57,775	16,303	



Construction Total Valuation In 37 States

(Unit: \$1,000,000)

	1941	1940	1939	1938	1937
Jan.	\$305.2	\$196.2	\$251.7	\$192.2	\$242.7
Feb.	270.4	200.6	220.2	118.9	188.3
Mar.	272.2	300.7	226.6	231.2	269.5
April	300.5	330.0	222.0	269.5	243.7
May	328.9	308.5	283.2	251.0	317.7
June	324.7	288.3	251.0	317.7	321.6
July	398.7	299.9	239.8	281.2	207.1
Aug.	414.9	312.3	313.1	281.2	207.1
Sept.	347.7	323.2	300.9	207.1	202.1
Oct.	383.1	261.8	357.7	202.1	198.4
Nov.	380.3	299.8	301.7	198.4	209.5
Dec.	456.2	354.1	389.4	209.5	
Ave.	\$333.7	\$295.9	\$266.4	\$242.8	

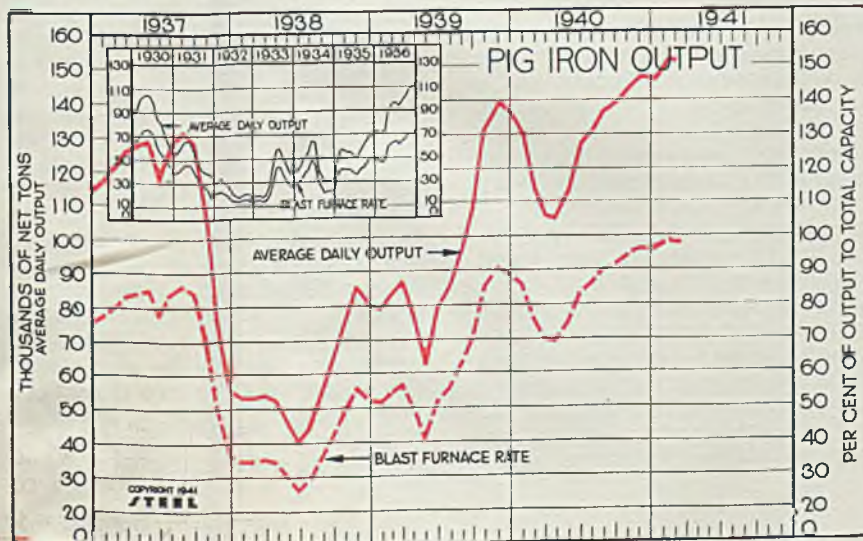
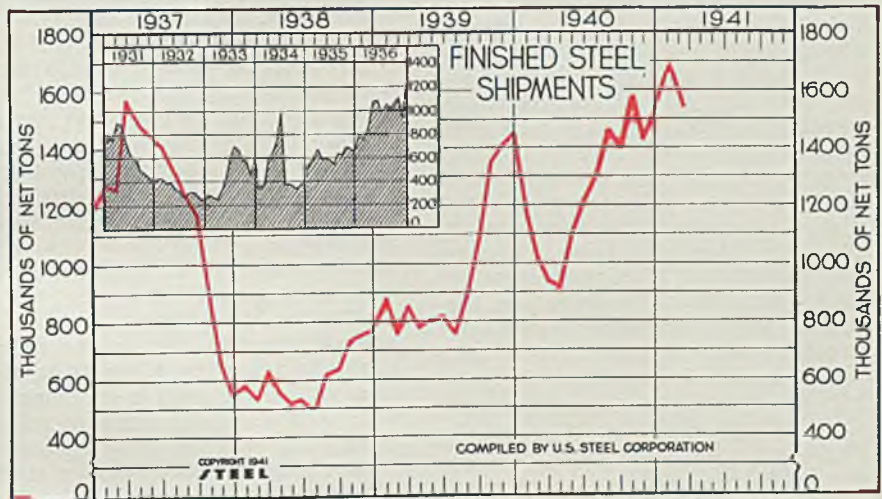
Finished Steel Shipments

U. S. Steel Corp.

(Unit 1000 Net Tons)

	1941	1940	1939	1938	1937
Jan.	1682.5	1145.6	870.9	570.3	1268.4
Feb.	1548.5	1009.3	747.4	522.4	1252.8
Mar.	931.9	845.1	627.0	1563.1	1485.2
Apr.	907.9	771.8	550.5	1485.2	1443.5
May	1084.1	795.7	509.8	1443.5	1405.1
June	1209.7	807.6	525.0	1405.1	1315.3
July	1296.9	745.4	484.6	1315.3	1225.9
Aug.	1455.6	885.6	615.5	1225.9	1161.1
Sept.	1392.8	1086.7	635.6	1161.1	876.0
Oct.	1572.4	1345.9	730.3	876.0	648.7
Nov.	1425.4	1406.2	749.3	648.7	539.5
Dec.	1544.6	1444.0	765.9	539.5	
Tot.†	14976.1	111707.3	7315.5	14097.7	

†After year-end adjustments.



Pig Iron Production

	Daily average		Blast furnace		
	Net Tons	Rate (%)	1941	1940	1939
Jan.	150,524	129,825	78,596	98.7	85.4
Feb.	150,127	113,943	82,407	98.5	75.0
Mar.	105,502	86,465	...	69.5	56.1
Apr.	104,635	76,732	...	68.9	49.8
May	112,811	62,052	...	74.2	40.2
June	127,103	79,125	...	83.6	51.4
July	130,984	85,121	...	86.1	55.0
Aug.	136,599	96,122	...	89.9	62.4
Sept.	139,085	107,298	...	91.5	69.7
Oct.	143,152	131,053	...	94.2	85.2
Nov.	146,589	138,883	...	96.4	90.3
Dec.	146,544	136,119	...	96.4	88.5
Ave.	128,128	86,375	...	84.3	62.6

The critical zinc supply situation means that now, more than ever before, is it necessary to make every pound of zinc do a 100 per cent job. Defense requirements mean every possible economy in use of zinc must be investigated and utilized to the utmost. Here Mr. Imhoff, a recognized authority in the field, points out what to do and how to do it to make sure you are not wasting any zinc in the present emergency

By WALLACE G. IMHOFF
President
Wallace G. Imhoff Co.
Vineland, N. J.

■ INCREASING tempo of the defense program has developed a zinc scarcity together with higher prices—both of much concern to every hot-dip galvanizer. Higher prices are a grave enough concern, but not being able to get metal at all, or only with great difficulty, is far more serious. Being entirely outside the control of the galvanizer, such a shortage leaves him with no choice but to employ the utmost efficiency in using the metal that he has already or can get.

Indeed, the situation is serious enough right now to warrant a complete checkup on every factor entering into the galvanizing operation to see where zinc losses can be lowered or eliminated. There are many losses over which the galvanizer has direct control. Zinc may be lost in the sal-ammoniac skimmings, in the oxide skimmings, from improper heat application, from poor dressing equipment, from freezing in the dross, from incorrect galvanizing practice, and in many ways normally hidden in materials, weighing or operating—or by direct theft. Each will be analyzed to show just where, and how, the zinc can be saved.

Sal-Ammoniac Skimmings: The sal-ammoniac skimmings can be a very large source of zinc loss in the form of small metallic balls, or zinc shot. The amount of zinc loss can be checked easily and quickly in a practical manner by taking a weighed amount of these waste sal-skimmings and dissolving them in water. This action will leave metallic zinc shot and basic zinc salts. The material, which may be in a bucket or other suitable container, is stirred vigorously to be sure that all of the soluble material is in solution. The water, of course, should be hot.

It is then allowed to settle. When absolutely clear, the water is poured

out, leaving only the basic zinc salts and the metallics in the bottom of the container. When the liquid is drained off, the solid material is dried over a slow fire so it does not cake. Then the powder is separated from the shot by screening.

The three components then can be estimated. The chlorides were soluble in the water and were decanted off; the basic zinc salts, dried or powdered; and finally the zinc shot, or metallics, left on the screen. Obviously a special sample of sal-ammoniac skimmings must be taken for the test, since ashes or any other material used to dry up the skimmings in removing them from the bath will make such a test impossible because of the error in solids introduced.

Flux Must Be Thin: Such a study will quickly show that the zinc shot are not always the same size. The question is: What determines the size and amount of the shot? Research investigations right in a plant under operating conditions revealed that when the flux is extremely acid and very thick, the zinc shot are large in size and very numerous; and that when the flux is almost neutral and is thin and watery, the zinc shot are very small and there are only a few of them. The explanation is that when cold, damp or wet articles go down through the flux, the zinc spatters and throws balls or particles of zinc up from the bath into the flux. If the flux is thick and heavy like molasses, naturally the balls of metal

are caught and held up in the flux. On the other hand, if the flux is thin and watery, the shot spatter up into the flux but quickly fall back through it into the bath again like metallic balls in water.

Thick heavy fluxes not only cause heavy metallic losses in the form of shot but also cause flux spots and result in the flux sticking in seams of formed articles.

Some pieces to be galvanized are heavy and big and so require heavy flux. This is especially true when the old fluxing technique is used—that is, a dip in muriatic acid and then into the bath through a sal-ammoniac flux on the pot. Here a thick flux must be used to prevent bad explosions of metal. The shot losses, therefore, are very high.

Improved Fluxing: This situation may be helped considerably by employing the liquid fluxing technique which first gives the article a dip in a liquid solution of zinc-ammonium chloride, and then passes it through a zinc-ammonium flux on the galvanizing bath. The technical background of this technique is based on the fact that more water is always available with zinc-ammonium chloride. Therefore the flux condition is always thinner and much more efficient. Water acts as a lubricant and allows the flux to slip off the surface of the work easily, and its thinness also allows zinc shot thrown up into the flux to fall back more easily. A way to check the zinc shot in the flux is to feel it with a hook. When the flux

How to Save Zinc In Hot-Dip Galvanizing

is fairly thin, the shot is at the bottom of the flux. When the flux is thick, the shot stays up in the flux and will be found scattered through it.

Better fluxing conditions with a consequent saving of metal may be brought about by—first, employing the liquid flux technique in place of the old muriatic acid fluxing technique; second, by keeping the flux in as thin a condition as practical; and third, by reducing the acidity of the flux to the lowest possible point consistent with good operating results.

Dross Loss Cut 40 Per Cent: A strong muriatic acid dip "tightens" the flux, makes it thick and viscous, thereby sending an enormous amount of zinc out as shot with heavy metal loss. For example, a change in one plant was reflected in both sal-ammoniac skimmings and dross production. The muriatic acid dip, which was high in iron content, was also a high dross producer. In two weeks before the change, 2248 pounds of dross were made. In three weeks after the change, only 2067 pounds of dross were made—a reduction of almost 40 per cent.

Here the high acid content of the muriatic acid flux had caused the heavy losses of zinc shot in the sal-ammoniac skimmings; and the high iron content of the muriatic acid was the cause of the high dross production. Employing a solution of zinc ammonium chloride instead of the muriatic acid eliminated both of these conditions causing high metal losses. Metallic loss in the flux was reduced by thinning out the flux and supplying water as a lubricant, thereby keeping the flux thinner.

Oxide Skimmings: One factor which may not be clear is that there are at least three different and distinct conditions present according to the field of galvanizing and the kind of work being done. Facts which apply therefore specifically to one field, may have less importance in another. For example, the three conditions are as follows: First, plants in which the entire bath is covered with sal-ammoniac flux, and where the oxide skimmings produced are very small; second, plants in which half of the bath is covered with a slag sal-ammoniac flux, and the other half is open as a drawing side through which the articles are removed from the bath; third, plants in which no sal-ammoniac flux is used on the galvanizing bath. Castings and sheet galvanizing baths are entirely covered flux; pipe and metalware baths are half covered with a slag sal-ammoniac flux; and baths for very small work do not have any slag sal-ammoniac flux on the bath at all.

The quantities of each kind of

There are many ways to economize in hot-dip galvanizing as Mr. Imhoff points out here. Quite often, even one of them will make possible important economies. It may pay you well to study your galvanizing operations and check the possibilities of more efficient operation

skimmings naturally will depend upon which practice is followed. The amount of each by-product therefore varies widely with the different plant conditions. Metal losses in the sal-ammoniac are important in those plants producing a large amount of sal-ammoniac skimmings. Similarly, metal losses in the oxide skimmings are of greatest importance in those plants that work with an open bath and make a large amount of oxide skimmings.

Draining range boilers and tanks, skimming in metal-ware galvanizing, and like operations produce large quantities of oxide and also metallics in the oxide in the form of flat "splash" metal as well as shot.

"Hand" Reclaiming Process: Reclaiming metallics from oxide skimmings has been done by hand methods—"burning off" the skimmings at the end of each week, or whenever the amount warrants. A small amount of the skimming is dumped on the open bath. The skimmings must be hot, so the first thing is to work them back and forth dry. When they are very hot, sal-ammoniac is scattered over them. The hydrogen and ammonia gases eliminated should be lighted instantly with a match so they will burn to furnish additional heat to melt the metallics in the skimmings, thus returning the metal back into the bath.

This vigorous stirring and working of the skimmings on the bath is continued until the dirt is a dark olive green color and most of the metallics have been melted up and returned to the bath. The green dirt is then scooped up in a flat perforated spoon, the metallic shot and molten metal are shaken back into the bath, and the dirt thrown into an oxide skimming barrel. This method is used in plants where the oxide skimmings are made in small quantities.

Quantity Reclamation: In large plants where a considerable quantity of oxide skimmings are made or where there may be by-products from two or three different kinds of pots—one making a large amount of sal-ammoniac skimmings, another making a large amount of oxide skimmings, and another making both of them—different recov-

ery methods are employed. The sal-ammoniac skimmings are first treated with hot water, being stirred and worked until the solid material is all loose and has settled to the bottom of the tank. The liquid then is run off, and the solids are removed and slowly dried. This gives a mixture of metallics and dirt, or oxide.

This material now is mixed with the oxide skimmings, which also are metallics and dirt, or oxide. This mixed material then is shoveled into a perforated revolving barrel with an air blast blowing through the axles. Balls are used as a pulverizer to loosen all dirt from the shot and metallics. As the cylinder revolves the fine dust is blown out through the axle to a tight bag house. The solids, or metallics, remain in the cylinder and are removed when a sufficient quantity has collected.

The shot and other metallics are then melted down in a furnace with a soft low-temperature reducing flame. The hearth is sloped to a pan in the front of the furnace, from which the molten metal is tapped off into zinc slabs. These can be used a few at a time along with the other good metal charged into the galvanizing pot. The fine powder is loaded into paper-lined box cars and sold to chemical companies. In large plants, much good metal is recovered by this process.

Keeping the Zinc Out: The practical question is how can less good zinc be sent into the dross? To change the character of the dross from a heat application standpoint, it is necessary to understand that there is a definite relation between the iron content of the dross and the temperatures in the galvanizing bath and in the dross. When heat application is correct, there should not be a temperature difference greater than 30 to 50 degrees Fahr. between the bath temperature and the temperature down in the dross.

Dross Temperature—The Critical Factor: Of equal importance is the fact that the iron content of the dross depends directly upon the dross temperature. For example, at 800 degrees Fahr. the dross will carry about 2.50 per cent iron; at 850 degrees Fahr. from 2.75 to pos-

(Please turn to Page 86)

Multi-Spindle Automatic Lathes for

M A C H I N I N G

High-Explosive

And Other Ordnance Items

■ Starting Jan. 27, 1941, this series of weekly articles on shell production has covered: One, a background on shell; two, types of shell and their metallurgy; three, parting off the billets and heating for forging; four, forging problems and the Witter cross roll; five, trends in shell forging, the Baldwin-Omes and upsetter forging machines; six, considerations in machining shell; seven, "emergency" lathes designed by National Machine Tool Builders' Association; eight, step-by-step pictorial study of operations at S. A. Woods Machine Co., from forging shop to shell loading plant.

Next week section ten will present a tabulation of machining methods and equipment prepared by the American Society of Mechanical Engineers from a recent survey of actual production work. It will include production rates and cost data.

■ WHILE the present tendency in this country appears to be away from the multi-spindle automatic and toward the "single purpose" lathe for turning

shell, opinion is by no means solidly in favor of this policy. Indeed we find the multi-spindle machine doing yeoman service in at least one large factory right up at the battle front in England. This plant, which has one of the largest batteries of Bullard automatics in Britain, employs them not only on shells—especially shells of small caliber—but on a variety of other jobs. For reasons explained in previous sections of this series, we in this country intend to use for shell turning single purpose lathes of the simplest possible design, reserving the highly precise and flexible multi-spindle automatic machines for tasks of greater exactitude and equal urgency. However, this series on shell machining procedures would not be complete without a description of the multi-spindle automatic, its operating features and advantages.

The first multi-spindle automatic lathe appears to have been developed by Messrs. Henn and Hakewessel in 1895. By contrast with the ordinary single-spindle lathe, in which the work revolves but retains its axial position, the multi-spindle machine has a group of spindles corresponding in number to the number of tool positions. In the first case, obviously the time required to finish a piece is the sum of the times of the several operations, while in the latter it is the time of the longest single operation. This advance in the principles of lathe design is dignified with the title of "simulation". Earlier machines of this type followed the lines of existing ma-

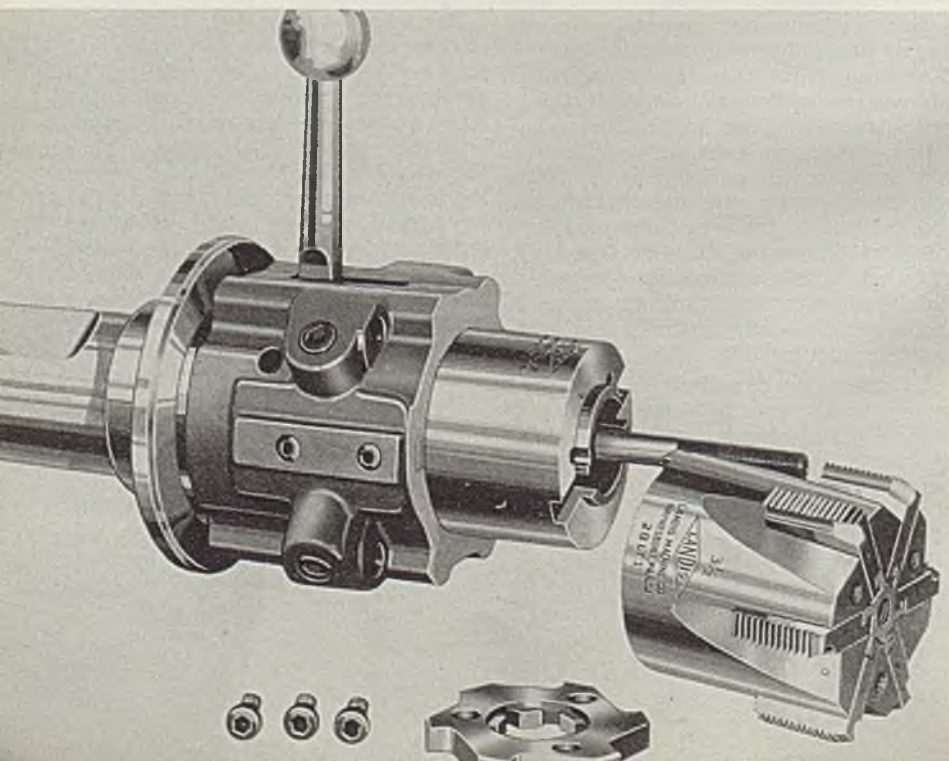


Fig. 1—Collapsible tap for threading shell on automatic lathes. Made by Landis Machine Co., Waynesboro, Pa.

By **ARTHUR F. MACCONOCHIE**
Head, Department of Mechanical
Engineering
University of Virginia
University Station, Va.

What position does the multi-spindle automatic hold in regards to ordnance work in this country? How does it differ from that in England? Here Professor Macconochie presents the answers and also traces development of the multi-spindle automatic, describes single and double indexing, the collapsible tap, cost of typical setups and production rates. Here, too, are presented complete sequence of operations in automatics machining 3-inch anti-aircraft shell, using double indexing, and also a straight sequence for machining 40-millimeter shell from bar stock without previous drilling. With 16 stations required for this latter sequence, two machines are employed. Tooling details also are included in this article

Shell

chines inasmuch as the axis of the indexing member was horizontal, but many later designs work in a vertical position.

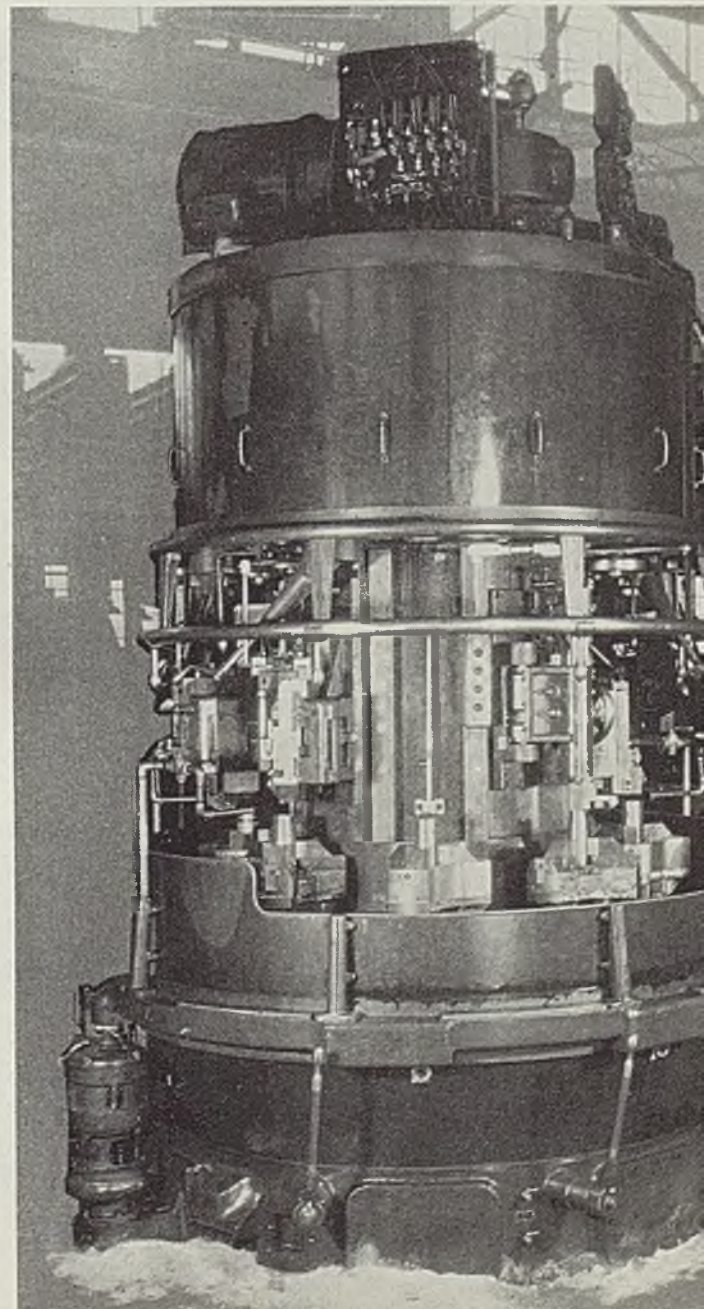
Thus, the modern multi-spindle automatic consists of a group of automatic lathes set up on end and so arranged about a central axis that the work is carried from one operation to the next without re-chucking and with obvious economies in space and driving arrangements. Each cutting operation has an independent feed controlled by operation cams, all the cutting tools working simultaneously. When the longest cut is finished the tools are withdrawn. Then the head, with all its spindles, is indexed round to the next position.

The Bullard Mult-Au-Matic has six or eight stations and may be arranged for "single" or "double" indexing. In the first arrangement, as many as eight successive operations are performed on one end of the shell without rechucking. If the total machining to be done on both ends of the shell can be performed in eight operations, the head is indexed around two stations at a time, alternate tool heads operating on base and nose. At the loading station of the machine, a fresh component is inserted in one chuck, while a piece which has had all the base operations completed, let us say, on the first round would be inserted, base down, in the other. Thus at each indexing a finished component comes out, a blank goes in, and a partly completed piece is turned over and re-chucked for the final series of operations on its second trip around.

Both types of indexing sequences are illustrated: A double indexing setup for machining operations on 3-inch anti-aircraft shell is shown in Figs. 2, 3, 4 and 5. Then single indexing—16 operations on two machines—is shown for 40-millimeter shell, machined from bar stock and not previously drilled. Included in this last series are complete details of the tooling layout.

A typical sequence of operations on shell of small

A Bullard multi-spindle vertical automatic working on 3-inch anti-aircraft shell



Other Articles on Production of Ordnance

■ For other articles in addition to the series by Professor Macconochie, see issue of March 11, 1940, p. 38, for Design and Modern Methods of Making Shrapnel Shell; Dec. 2, 1940, p. 50 for Operation and Construction of Bofors Anti-aircraft Guns; Oct. 14, 1940, p. 160, and Jan. 6, 1941, p. 219, for How Technical Progress Aids Defense; Jan. 13, 1941, p. 48, for Some Typical Shell-Forging Methods; Jan. 20, 1941, p. 54, for Recommendations on Heating Billets for Shell Forging; Jan. 20, 1941, p. 74, for Making Cylinders for Packard V-12 Torpedo-Boat Engines; Feb. 10, 1941, p. 67, for New Method of Checking Gun Bores.

caliber, machined from bar stock, might be somewhat as follows: After parting off suitable lengths from the bar, these might be centerless ground, some 0.035-inch being removed in four passes. To save time on the multi-spindle automatic, a core-drilling operation on a multi-spindle drill might be undertaken. Such a machine might have as many as 10 stations and 18 spindles, each station accommodating two work pieces side by side. Since the spindles operate in pairs, the total drilling operation would be carried out in nine steps.

Then for the first round on the automatic, after loading at the first station, accompanied by proper location of the work and a check on concentric running, third station would form the recess in the base (if British type shell) rough turning the groove for the copper band, etc. At the fifth station, the third operation would consist in finishing the recess for the base plate, turning the reduced diameters at the base end of the shell and under-cutting at each side of the groove to produce a dovetail. At the seventh station, finish facing the base and cutting the sinuous ridges in the base of the groove would complete the first round.

The second round would commence by re-loading the piece, nose end up, and checking for concentric running. Thereafter would follow in succession: Reaming the nose, forming the ogive, and tapping the nose to receive the fuse.

This latter is done with a collapsible tap, Fig. 1, which shows very clearly the front end of the tap with the chaser-retaining cap removed to reveal the "plunger" on which the chasers seat. This plunger has a $14\frac{1}{2}$ degree angle to suit the bottom of the chasers and is formed with guides to insure positive withdrawal of the chasers on retreat of the plunger. Movement of the plunger is accomplished by means of the threaded stud seen projecting from the tap body, this stud being actuated in turn by a trip ring (not shown). On contacting the face of the work, the trip ring releases a latch contained in the interior of the

body of the tap, upon which the plunger is drawn up and the chasers collapse, the amount of the movement of course being sufficient to clear the root diameter of the thread. While threads produced by the tap may not be as good as those cut by a thread miller, they pass inspection and suffice for the purpose. Even the British War Department appears to have modified its specifications to include the tapping of shell noses by this means.

The accompanying illustrations detail methods employed by the Bullard Co. in machining various caliber shell. The sequence of operations is given in each case, thus enabling the reader to follow the process step by step from the point where the component is loaded into the machine to the completion of each round of six or eight stations. The series on the 3-inch anti-aircraft shell shows the double indexing feature. The other series is single index work. Features of interest not shown include the provision of special jaws for the reception of the work; dial gages to insure true running work; mounting on the chuck of a face cam for actuating the tool when cutting the sinuous ridges in the base of the band groove especially where the design of the shell calls for this pattern.

Concerning the cost of the multi-spindle automatic, figures kindly supplied by the Bullard Co. indicate that the machine cost on an 8-inch 8-spindle machine for machining 75-millimeter shell would be around \$28,000.

Both the tools and fixture costs would be about \$8000—a total of \$36,000. Such a machine arranged for double index, for both nose and base operations, would have an hourly production of 75 pieces at 80 per cent efficiency.

For 155-millimeter shell, a 16-inch 6-spindle machine would cost \$32,000 for the nose operations alone. The cost of tooling and fixtures for the first chucking would be about \$6500—a total of \$38,500. The production rate would be about 75 pieces at 80 per cent efficiency in this case, also.

Apart from the question as to our ability to build multi-spindle automatics in sufficient quantities to meet the needs of the shell program, perhaps the only important criticism against their use is the effect which failure of one operation has in holding up the rest.

How serious this may be in actual practice can best be estimated by reference to the long and successful record of machines of this type in a wide variety of applications.

Contrariwise they exhibit in a marked degree those principles of tool design primarily responsible for the present highly developed state of the machine tool industry—especially in this country. By an ingenious combination of units and a transfer of skill which is virtually complete, we approach within measurable distance of that Mecca which all good engineers seek, where all things will make themselves and we can take our ease.

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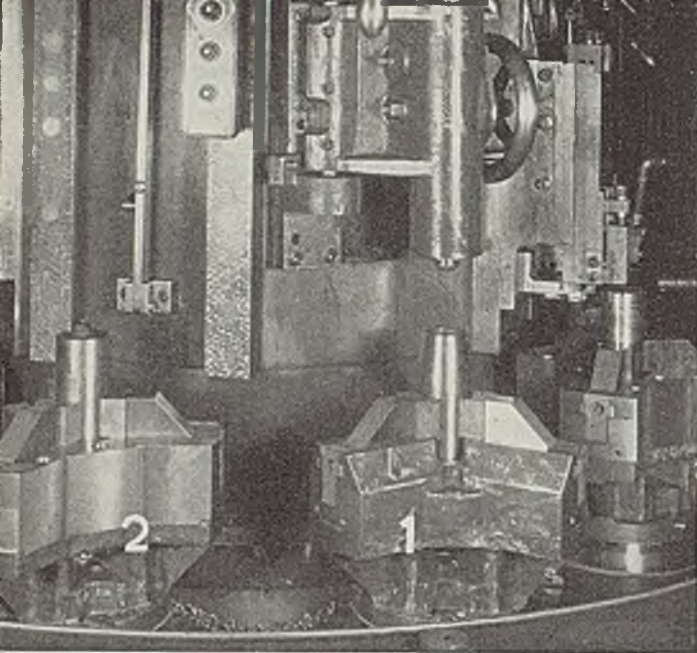
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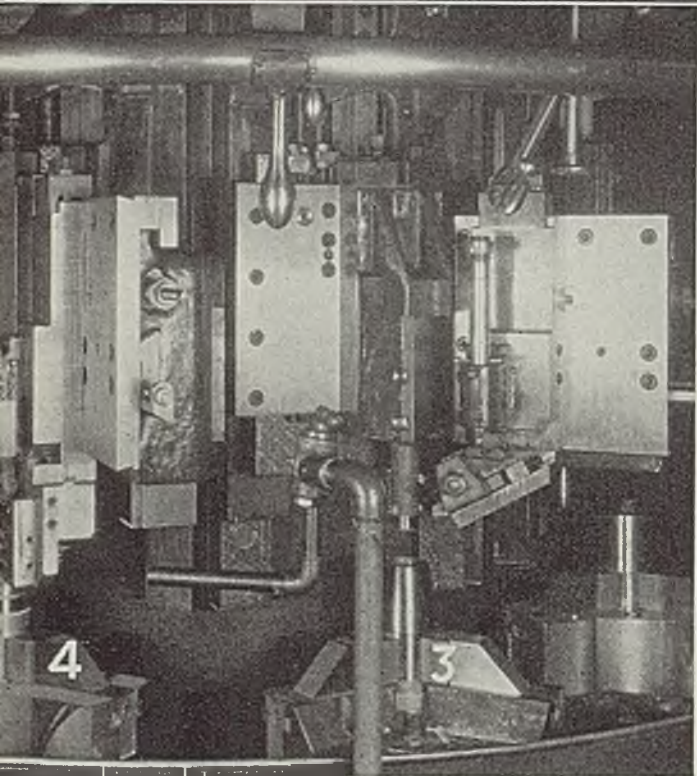
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—TOP, LEFT—

Fig. 2—Station 1, right center: Load, nose end up in 3-jaw fixture. Note loading depth gage above station. This enables operator to set each shell in the fixture at the correct height in relation to cutting tools. Station 2, left center: Reload for second time around, base end up, 3-jaw fixture. Hold-down device on machine column is used to seat shell properly in fixture



—LEFT—

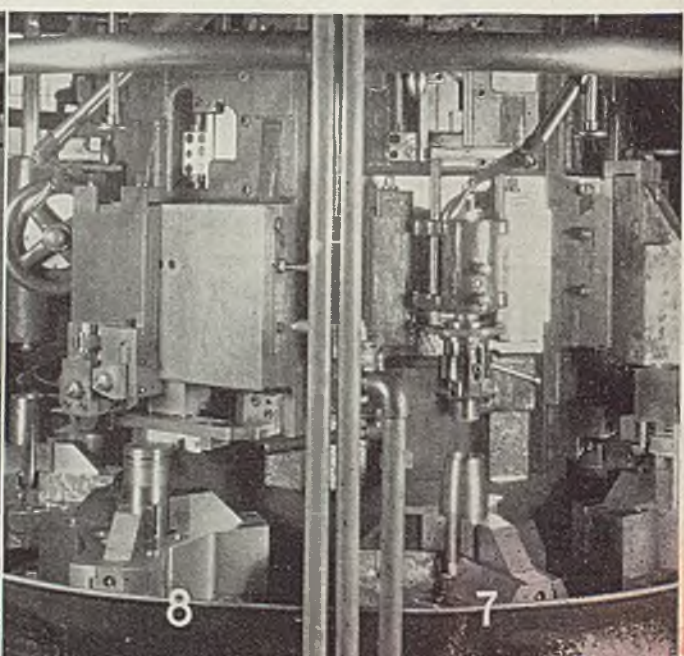
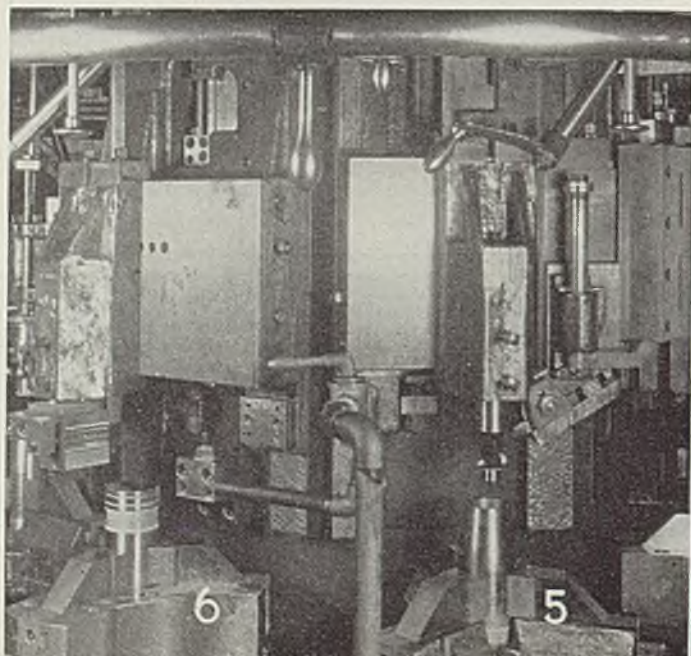
Fig. 3—Station 3, right center: Rough bore and chamfer shell nose with center slide, and rough face top of shell with righthand cross slide. Station 4, left center: Remove stem from base end of shell with center slide, and rough face shell base with lefthand cross slide

—LEFT, BELOW—

Fig. 4—Station 5, right center: Finish bore, undercut and finish face shell nose. Station 6, left center: Form band seat grooves on base end of shell

—BELOW—

Fig. 5—Station 7, right center: Thread shell nose with collapsing tap; ends work on nose end. Station 8, left center: Finish face base end of shell and chamfer band seat groove; ends work on base end



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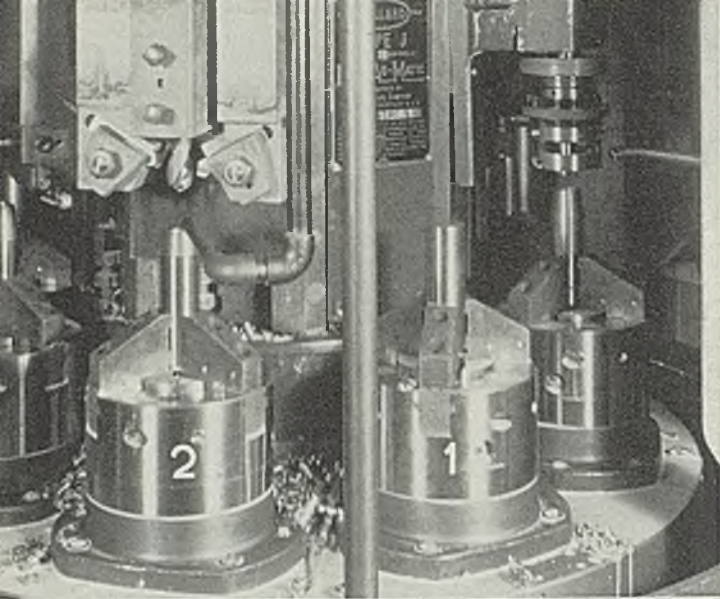
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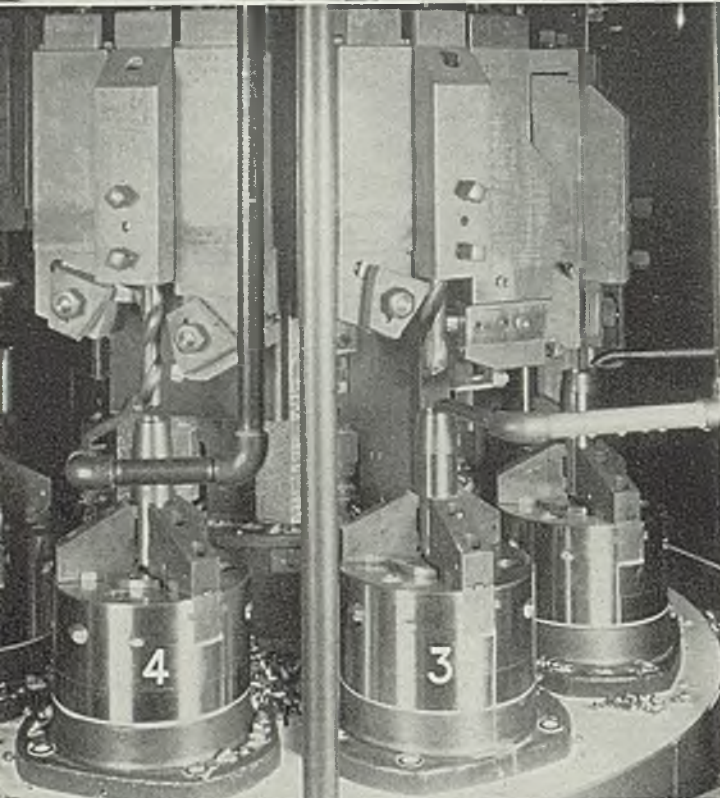
Company



—TOP, LEFT—

Sequence of operations on 40-millimeter (or 1½-inch) shell bodies, using a Bullard Type "J-7" 8-spindle Multi-Au-Matic as shown here, employs two machines—16 stations—to prepare the shell from solid bar stock, not previously drilled. Figs. 6, 7, 8 and 9 show the sequence of the first eight operations—all on the nose end—handled on the first machine. Figs. 10, 11, 12 and 13 show sequence of last eight operations on the base end, handled in the second machine. Both machines index spindles a single station at a time in contrast to two stations at a time as done with the double indexing sequence shown in Figs. 2, 3, 4 and 5

Fig. 6—Station 1, right center: Load-unload station. Work is inserted nose or open end up in 3-jaw chuck. Station 2, left center: Drill one-third of shell cavity, and rough turn tapered boat-tail of shell



—LEFT—

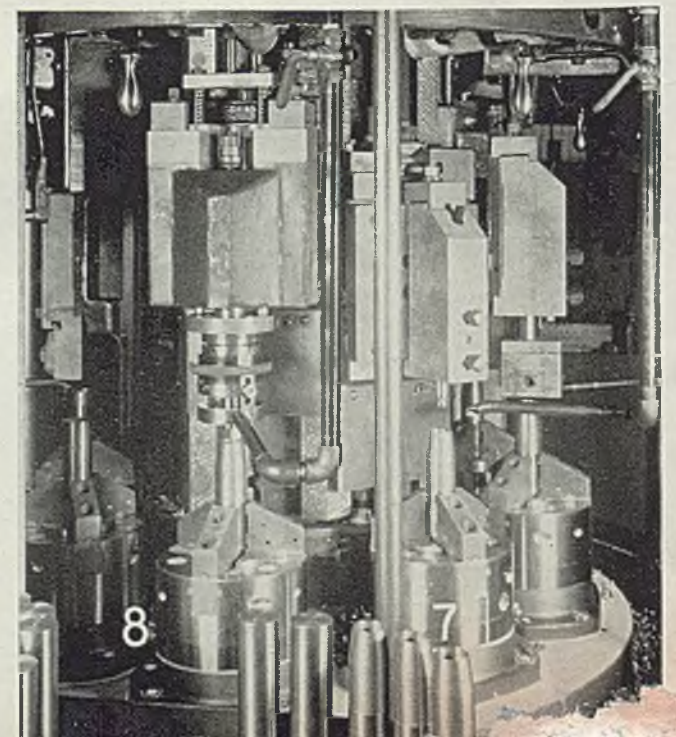
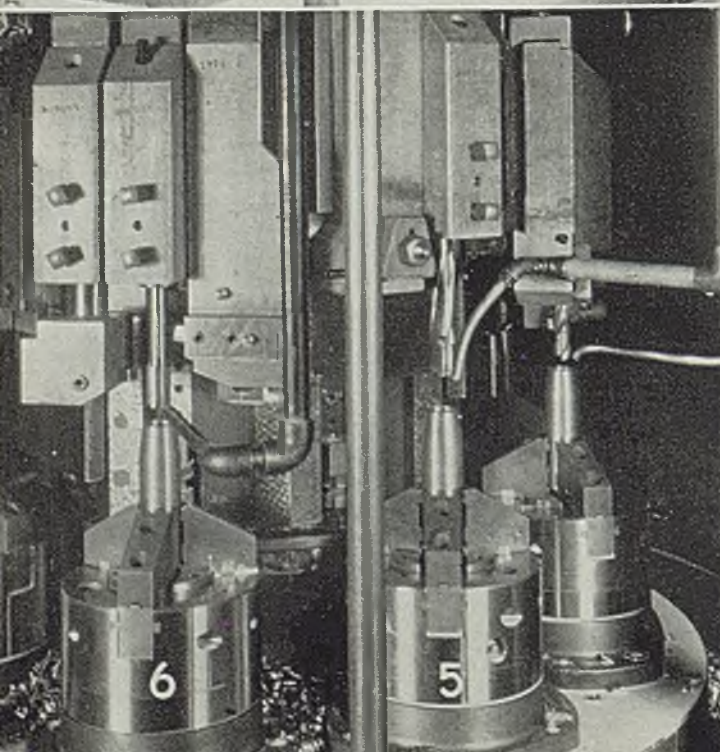
Fig. 7—Station 3, right center: Drill second one-third of shell cavity, rough taper turn shell boat-tail, and sweep top face of shell. Station 4, left center: Drill last one-third of shell cavity, rough turn outside diameter to top of jaws, and sweep top face of shell

—LEFT, BELOW—

Fig. 8—Station 5, right center: Core drill shell cavity with 2-step drill and form radius on top of shell face. Station 6, left center: Ream lower portion of shell cavity, finish turn outside diameter of shell to band seat groove, and finish taper turn boat-tail of shell

—BELOW—

Fig. 9—Station 7, right center: Finish bore, chamfer, and undercut top of shell cavity. Station 8, left center: Thread top of shell cavity using a collapsing tap

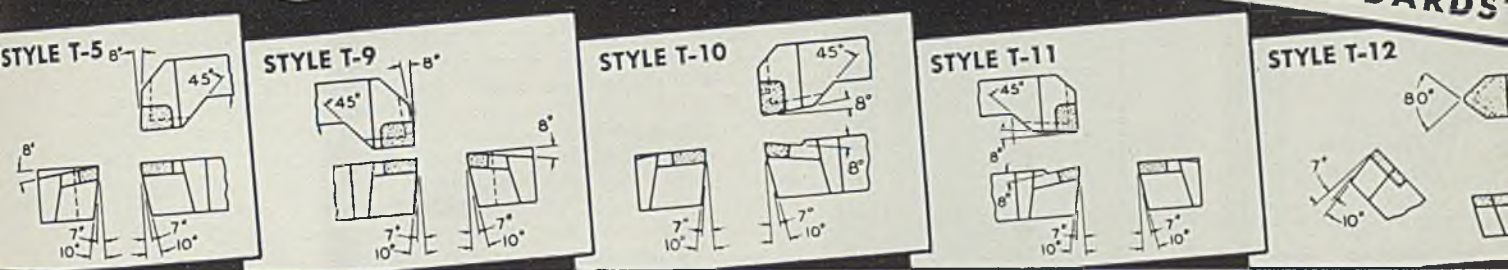


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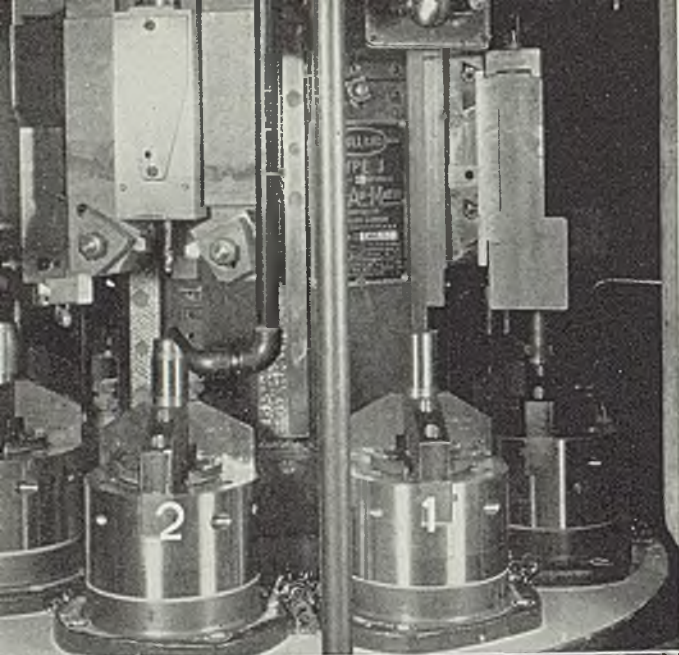


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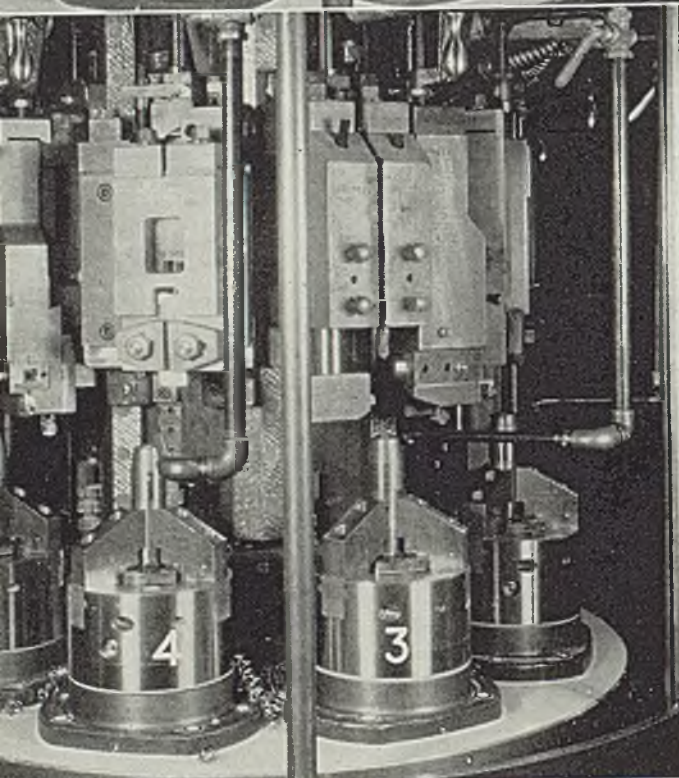
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Production per hour at 85 per cent efficiency is 56 pieces for machine and nose-end sequence shown in Figs. 6, 7, 8 and 9. Similar production for base end of shell as shown in Figs. 10, 11, 12 and 13 is 90 pieces. Thus a typical production setup would probably involve twice the number of machines for operations on the nose end as are used for work on the base end

—TOP, LEFT—

Fig. 10—Station 1, right center: Load-unload station. Work inserted base or closed end up in 3-jaw chuck. Station 2, left center: Drill cavity in base of shell with 2-step drill, and rough turn tapered boat-tail of shell



—LEFT—

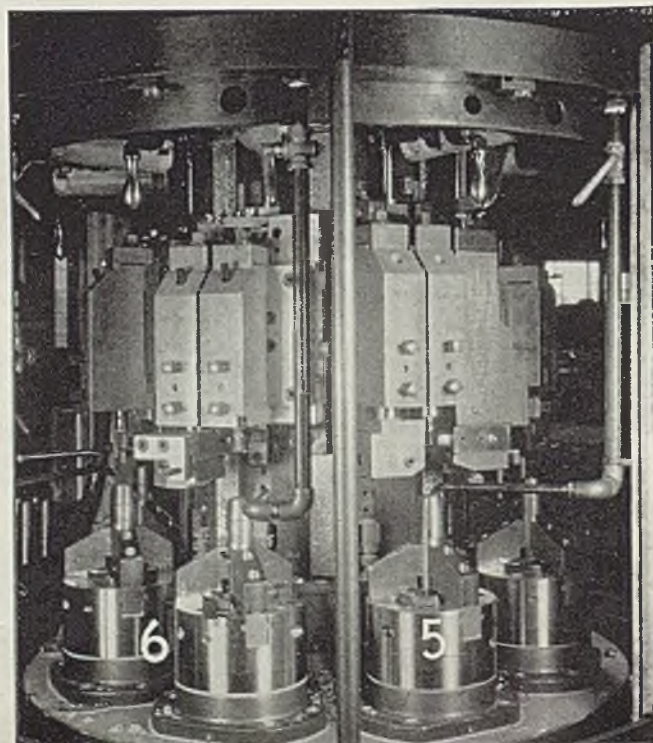
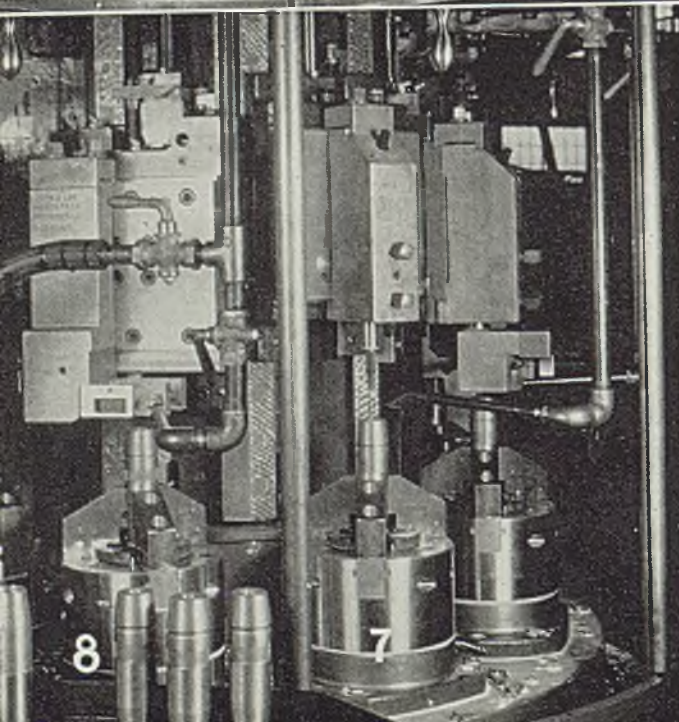
Fig. 11—Station 3, right center: Drill base cavity to larger diameter, rough taper turn boat-tail, rough turn outside diameter to base of band seat groove. Station 4, left center: Rough and finish face base end of shell

—BELOW—

Fig. 12—Station 5, right center: Finish bore cavity, finish turn tapered boat-tail, and finish turn outside diameter of shell to top of band seat groove. Station 6, left center: Under-cut cavity, and form band seat grooves

—LEFT, BELOW—

Fig. 13—Station 7, right center: Ream cavity with 2-step reamer. Station 8, left center: Knurl band seat of shell



Gas Association Holds Two-Day Conference at Baltimore

Meeting Reveals Heavy Gas Consumption in Metal Industries Due to Preparedness Program

■ USE OF GAS for various industrial purposes continues to show increasing diversification and improved efficiency. In the metalworking industry growing consumption may be attributed in large measure to effects of the preparedness program.

These facts were brought out in papers presented at the conference conducted by the industrial and commercial gas section, American Gas Association, at the Lord Baltimore hotel, Baltimore, recently. Nearly 200 representatives of equipment manufacturers and the gas utility industry attended the two-day meeting.

Many Furnaces Needed

A wide variety of sizes and types of furnaces are required in armament manufacture, it was pointed out by F. Coleman Starr, Surface Combustion Corp., Philadelphia. In the production of ammunition and guns for aerial warfare alone there are the following general groups: Projectile furnaces; shell case or cartridge case furnaces; gun barrel furnaces; furnaces for gun mounts, carriages, etc.

Each of these headings may be broken down further. Projectile forging furnaces, for instance, may be of the rotary, pusher, conveyor or batch type, he indicated. For projectile normalizing the type may be the walking beam, pusher or rotary, while for projectile hardening and drawing the furnace employed may be the walking beam, pusher, rotary or conveyor type. Typical installations were described.

Developments in the use of gas fuel for short-cycle curing of industrial finishes were presented by Carl P. Mann, Selas Co., Philadelphia, in a report sponsored by the committee on industrial gas research. Work on this subject clearly demonstrates that gas fuel possesses unusual advantages over other means of heating in short-cycle curing, according to Mr. Mann.

Use of gas unit heaters is the answer to numerous heating problems in industrial plants, according to W. N. Blinks, General Gas Light Co., Kalamazoo, Mich. Among various applications he pointed out that a number of steel processing and fabricating plants have converted extensive pickling tank heating to gas, thereby reducing demand for steam with resulting poor efficiencies of the main boiler plants. Elimination

of such inefficient heating facilities is being given careful consideration at such plants.

Results of research on the application of industrial gas were discussed in a comprehensive paper presented by William R. Teller, chief testing engineer, American Gas Association Testing Laboratories, Cleveland. Subjects covered included: Composition of fine gases resulting from combustion of gas with a deficiency of air; calculation of flue losses from industrial gas furnaces using special atmospheres; and design of atmospheric gas burners.

Widening the field of immersion heating by at least 300 degrees Fahr. so that today 1500-degree operating temperatures are entirely acceptable to this process, is one of the outstanding industrial gas equipment developments of the past year, it was stated by Elmer B. Dunkak of C. M. Kemp Mfg. Co., Baltimore, in a symposium devoted to such developments. Applications in the higher

temperature field include wire annealing in hot lead pans and the use of chemical reaction kettles.

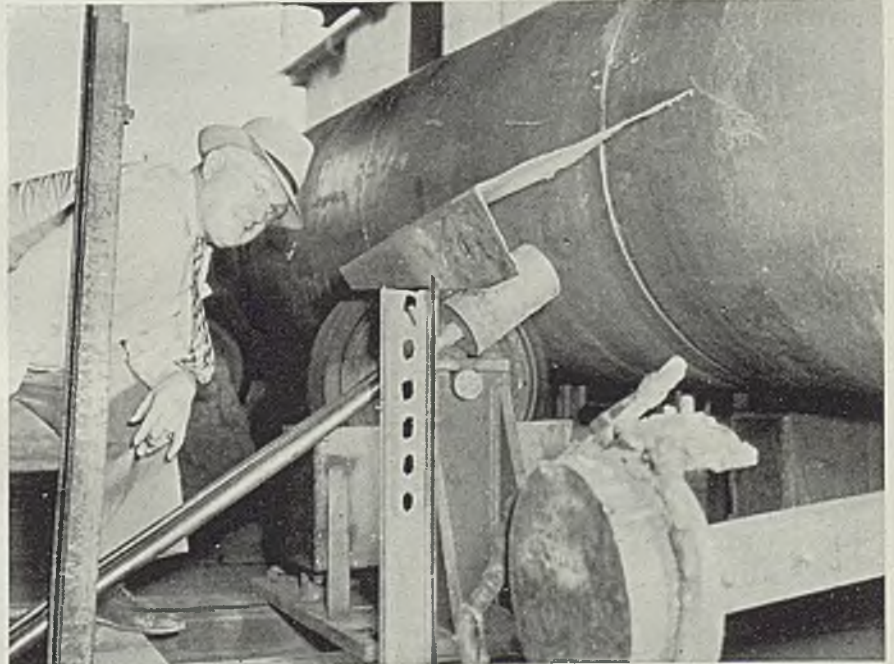
Herman Gehrlich, Gehrlich & Gehrlich Inc., Woodside, L. I., pointed out that the use of convection heating for temperatures up to approximately 1000 degrees Fahr., particularly in larger ovens, has increased tremendously since the defense program has gone into effect. Manufacturers of brass shell cases, for instance, have been called upon to produce large quantities of those items in a comparatively short length of time. This demands larger oven loading capacities than would normally be encountered in that industry.

"In one plant," he said, "we have made three installations, each one loading about seven-hundred-fifty 75-millimeter shell cases. The time cycle is 15 to 20 minutes to raise the load from room to approximately 500 degrees Fahr., and then soak for about one hour. Another installation loads approximately one thousand 75-millimeter shell cases per load with the same time and temperature cycle.

"These installations are of the direct gas, recirculating type and are maintaining temperatures in one case at 2½ degrees Fahr. plus or minus and in the other, 3 degrees Fahr. plus or minus. Temperature

(Please turn to Page 80)

Big Torch Heats 3-Inch Steel Shell Quickly



■ W. C. Leahy, plant manager, Wyatt Metal & Boiler Works, Houston, Tex., checks placement of a compressed-air-and-natural-gas burner. Being movable, it can easily be adjusted to throw its best heat where needed. Here it is preheating a butt joint between sections of a pressure vessel for the chemical industry as the vessel is rotated on the rollers shown. Walls 3 inches in thickness are brought up to temperatures between 400 and 800 degrees Fahr. with no difficulty

Liquid Rubber Pulley Coating Increases Pull

■ A new liquid product which is applied to pulleys to prevent belt slippage is reported by Nonslip Pulley Covering Co., 777 Hertel avenue, Buffalo.

Known as Nonslip Rubberpull, it is applied with a brush to the face of any pulley, flat or V-type, and according to tests it increases the efficiency of belt drives as much as 50 per cent.

The product has a rubber base and is so compounded that it sticks to the pulley face regardless of the pull exerted upon it. Its other feature is that it can be applied in a few minutes at the end of the

day, and the pulleys are ready for use the next morning. The product comes in containers of two convenient sizes.

Issues Final Report On Road Surfacers

■ American Institute of Steel Construction, 101 Park avenue, New York, reports the compilation of the second and final report of a traffic test of a thin asphaltic surfacing for battledeck floors for highway bridges. This describes the condition, after three years under traffic, of the material which was applied to a steel battledeck floor panel in one of the main roadways of the Bethlehem Steel plant.

New Wrinkle Finish Stands Rough Usage

■ A new one-coat wrinkle finish, Rincontrol, featuring good adhesion and properties for withstanding salt spray and humidity is announced by Roxalin Flexible Lacquers Co., Elizabeth, N. J. It permits finished parts to be handled in bulk without chipping or flaking and is sufficiently flexible to permit mild forming.

The finish dries uniformly at various temperatures in any oven, and can be used on sheet steel, die castings, aluminum and even wood. It also resists marring, abrasion and perspiration. It can be applied by spray equipment.

New Gondola Top Can Reduce Freight Costs Greatly

■ NORMALLY, high finished steel products must be shipped in box cars, loaded by hand or by truck in relatively short lengths. Costs are reduced considerably where it is possible to ship steel in open gondolas, permitting top loading through the use of overhead cranes. However, finished steel must be protected from the weather when shipped in open cars, and ordinarily such protection obtained through the use of waterproof paper wrappings or tarpaulins, is prohibitive in cost.

One answer to this problem is seen in the development of a sectional top for gondolas by J. M. Hilbish and J. H. McCahan, Pittsburgh. Light in weight, the sections are fabricated from 20-gage sheet steel and reinforced with 3/16 x 1-inch flats and

1 x 1 x 3/16-inch angles. Each section weighs approximately 70 pounds, is either 24 or 34 inches in width, and is adjustable in length to fit varying width cars. The entire top for a 46-foot car weighs approximately 1200 pounds. Normally this is formed of 16 sections, but the number may vary according to car length and width of the particular sections used.

A complete top can be installed by two men in less than two hours. Its removal is a matter of only a few minutes.

Sections interlock with each other by means of a standing seam, interlined with sponge rubber to form a waterproof seal. Joints between the ends of the sections and the car sides are interlined with waterproof

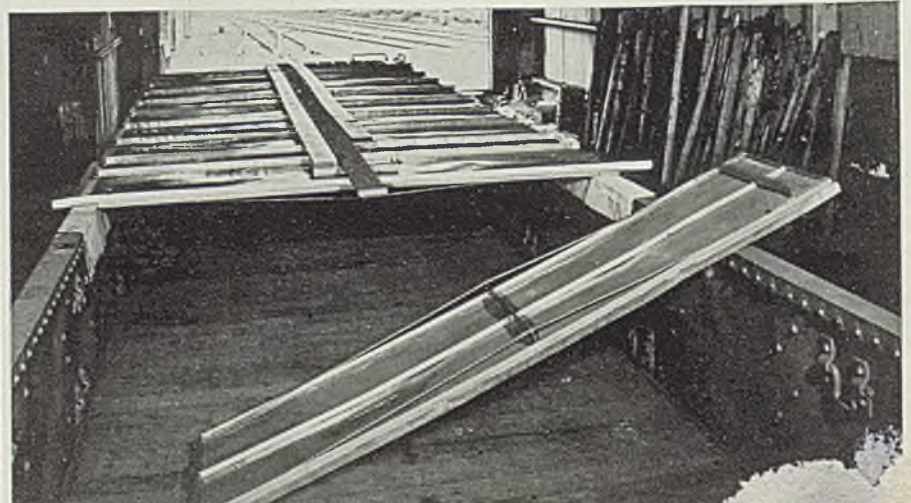
paper to prevent seepage. Each section is fitted with a board catwalk at the top center, forming a car-length catwalk when all covers are in place, thus affording a means for members of train crews to traverse the car top safely. Sections will support a minimum load of 100 pounds per square foot.

Feature Fool-proof Fasteners

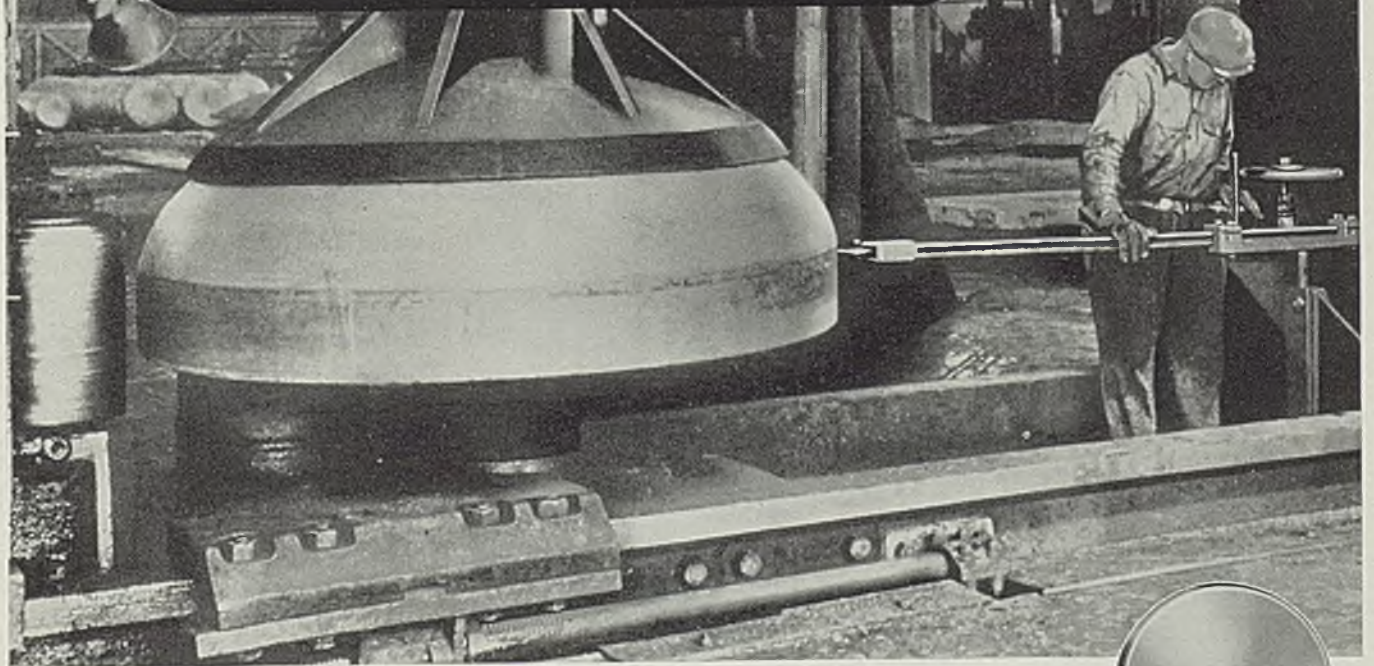
Heavy tension coil-spring fasteners, permanently attached to each section, hook over the bulb angles at the side of the car and hold each section rigidly in place. Special lever tools have been developed to carry out the fastening process easily and quickly, providing a tough fastening which cannot be tampered with in transit.

Since the top is metal, it eliminates any fire hazard and is impervious to moisture and wind. Cost is estimated at about equal to a first class tarpaulin job, including fittings. The unit is preferable to tarpaulins from the carrier's point of view since it eliminates necessity for the train crew to climb among the loads on a moving train. The system has been approved by the bureau of safety, interstate commerce commission, and is patented.

Left, gondola with top in place. Raised seams, running across the car, are interlined with sponge rubber seals to make them watertight. Permanently attached spring tension fasteners hold sections to the car at the edges. Right, car in process of covering. Note the tilted section in the foreground is turned upside down to show its construction. The angle at upper end is adjustable to fit tightly cars of different widths. This view also shows the method of sealing the top sections to the car sides by use of waterproof paper



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Why Successful Cold Riveting Requires

Flat-Head Rivets

and

Compression Riveters

with

Pressure Controlled Automatically

The factors essential for successful cold riveting were explained last week in the second of this series of articles. See STEEL March 17, 1941, p. 64. Here the author points out the reasons for unsatisfactory attempts to cold rivet and presents details of recommended practice for successful use of the process in production work

By **RAYMOND S. OSBORNE**
Consulting Engineer
Pittsburgh

■ RIVETING is as old as the use of metals, and like many old arts it has been standing as is for a long time. Some practices in it have continued simply from force of habit after the original need has disappeared. Just who started the button-head rivet or just why it was started, no one seems to know. Maybe it came from being easy to draw.

In any case, after looking at button and steeple-head rivets driven hot for so long, there are many fabricators who look askance at any other shape of head and any other method of driving. Such men believe there is more reason behind the shape of head and method of driving than actually exists. In many cases the original reasons for the shape of head and method of driving may no longer apply. Such is the case with cold-driven rivets, as was explained in the second of this series of articles, in *STEEL*, March 17, 1941, p. 64. Although some fabricators have tried them, it was possibly with no full appreciation of the factors involved and the type of head most valuable. As a result, the process may have been discarded without proper consideration.

The introduction of larger sizes of compression driven cold rivets has brought a definite need for a radical change in the type of head. From considerable experience in riveting, I would say that the button head is probably the most difficult with which to get tight work, especially with pneumatic hammers and particularly if the head be large for the rivet. This may be the chief reason for the change to the steeple-head rivet in most pressure work, though caulking has a lot to do with this as the steeple-head rivet is much better suited to caulking than the button head.

Pressure Control Essential: When an investigation of cold driving was first begun, controlling the pressure was found to be absolutely essential. With controlled pressure, cold riveting can be done with highly satisfactory results. Without this control, it is impossible to get away from distortion and damage to the work, particularly when the work is rather light. It is interesting to note that automatic control of pressure results in much better percentage of tight hot-driven rivets also.

A study of cold driving soon revealed that the button head was very difficult to drive cold, causing off-side heads because the rivets skated around in the die. Also, the button head requires more pressure to drive cold than the average work would allow. For this reason, many various shaped heads were tried—button, steeple, modifications of these, mushroom, flat, etc. It was found that the

only practical head to drive cold was the flat head. Button heads and others driven with dies that confined the metal at the point of the rivet in forming the head require pressures too high to use with ordinary run of work. The result is excessive distortion.

Drives Cold Easily: The flat head, however, is easily driven with uniformly satisfactory results. The metal forming the head is not confined and can flow to the extent desired without exceeding the pressures that can be used without distorting the work. The least deformation of the head by a die was found to increase greatly the pressure necessary to drive the head. This effect was much greater than first expected. With a flat head, the driving is done with a flat surface and the diameter of the head depends upon the pressure applied. This allows minimum pressure to be used. A slight excess of stock does not cause trouble, simply making the head slightly higher. To drive in this manner, it is necessary to have the pressure applied to the rivet automatically controlled and adjusted exactly to the requirements.

Instead of being a makeshift, the flat head has many characteristics that make it desirable. The metal of the head is where it is of most value, and is not over the shank where it does no good. Being a flat surface with a thick edge, it is a better corrosion resisting head. A button head, for instance, usually starts to corrode at the thin edge and at the top or point and will deteriorate much faster than the flat surface of the plate in which it is driven.

The flat head is easier to paint and thus is apt to get better initial protection. Caulking cold-driven rivets is practically never necessary due to the extremely tight fit produced. Of the many thousands of cold flat-head rivets I have seen driven, caulking was necessary on none of them. As far as caulking after being strained is concerned, if the strain were heavy enough to make the rivet leak, the hole in the pieces riveted would be so enlarged or destroyed that it would be necessary to renew the joint.

As to appearances, prominent fabricators and engineers have pronounced that the appearance of work with flat-head rivets was equally as good as any other.

Macrographs of etched sections of hot-headed rivets before being driven revealed that the button head did not seem to have so good a grain structure as a flat head. A sharp change in grain structure at the neck of the button-head rivet is noticeable, whereas the flat head has a gradual change. This is interesting as it bears upon rivets inaccessible to the compres-

sion riveting machine. Such rivets must be driven by hand with pneumatic hammers, and if the work is to have a uniform appearance, flat heads would have to be driven on these also. This is entirely feasible with proper riveting dies and dolly bars. If a better grain structure is produced with a flat head, why should it not be used on all work, or why not adopt them generally?

There is bound to be some antagonism toward flat heads on the part of those accustomed to look at hot-driven button and steeple heads for years. However, in addition to having better corrosion resistance and having the metal where it will do the most good, flat-head rivets incur less die expense and require less stock to

of the rivet. Instances have occurred, due to faulty design or to accident, when the rivets have been subjected to strains far beyond that which they could stand. In such instances, the shank of the rivets failed below the head, usually on the line of contact of the

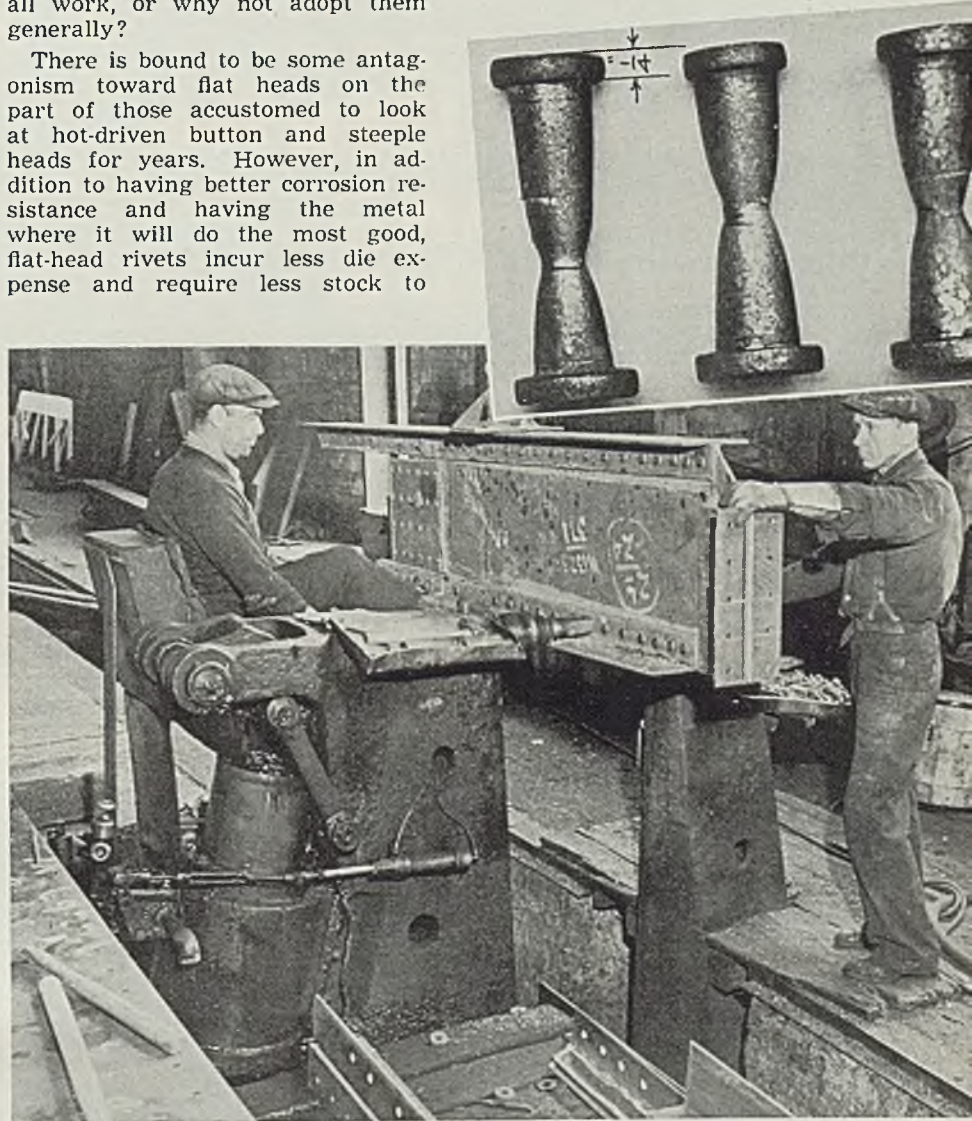


Fig. 1—Stationary machine for driving rivets cold. It handles structural work in the plant of the Dravo Corp., Pittsburgh, and employs the Osborne automatic pressure control system diagrammed in Fig. 5. Fig. 2—Result of a test by the Dominion Bridge Co. Ltd., Montreal, showed a strength of about 70,000 pounds per square inch, produced by a load of 49,000 pounds of $\frac{3}{8}$ -inch diameter cold-driven rivets. Note inset view. As a result of a \$6000 investigation of cold driving, this company changed over to cold riveting

drive, making easier driving and less tendency to bend in driving.

They insure tightness and stronger work.

Fig. 3 shows a properly designed flat head. On very light work, compared to the rivets being driven, it may be necessary to use a rivet head of slightly smaller diameter to avoid distortion of the members being joined. In direct tension or shear, this head when driven cold will break the shank

two surfaces riveted together.

Pittsburgh Testing Laboratory made a number of tension tests on flat-head rivets driven cold and on button-head rivets driven hot. A butt-joint with butt straps consisting of four angles riveted back to back in pairs with short legs each side of the joint riveted together by hot riveting with $\frac{3}{8}$ -inch rivets showed a yield point of 68,600 pounds and ultimate strength of 75,850 pounds. Irregular tension

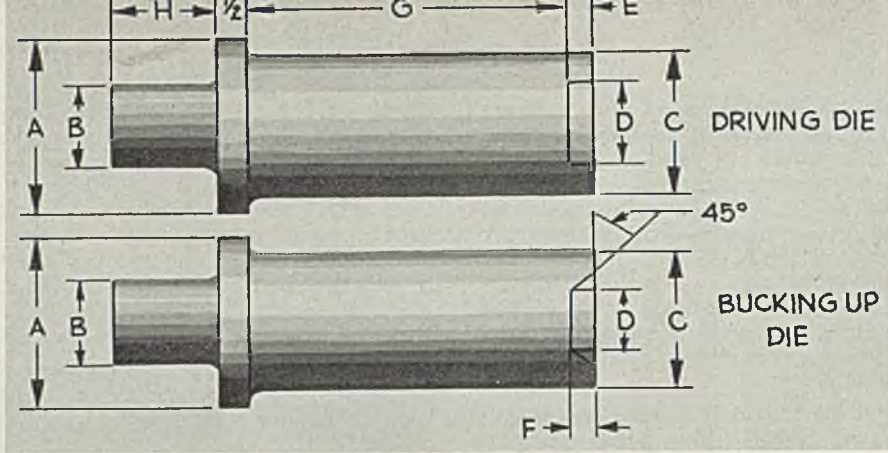


Fig. 4—Driving and bucking-up dies recommended for cold riveting work. Dimensions are given in Table I

failure in the plates through the three rivet holes was produced. Another sample, also hot riveted, gave yield point of 67,800 pounds and ultimate strength of 74,700—closely checking the above figures and with the same type of failure.

A cold-riveted joint of the same design and same size rivet showed a yield point of 70,600 pounds and ultimate strength of 77,450 pounds with the same irregular tension failure through the three rivet holes. While the test failed to show the actual strength of the heads, because the design of the test pieces did not allow sufficient strength in the plate gripped by the testing machine, sufficient load was imposed to show that the flat heads are amply strong. There was a load of 75,100 pounds per square inch on the rivet shank when the plate failed in the cold-riveted piece.

Summary: The most practical head to drive cold is the flat head, for rivets with proper flat head are at least equal to those with other shaped heads. When driven cold, the rivet steel is actually strengthened and not damaged as may occur with over deformation in making certain other heads. The material in the head is where it does the most good. Rivet stock is saved to an extent that more than offsets the extra cost for annealing. Annealed rivets must be used for most uniformly satisfactory results as was explained last week. See *STEEL*, March 17, 1941, p. 64.

Lower driving pressures are required and consequently less power consumed. A flat head is more easily driven. The grain of the steel in the head hot-formed flat during manufacture of the rivet, is better. They are equally as strong as other shapes as shown by tests. They are neat in appearance. Also, rivet die expense is decreased. In case rivet manufacture also is carried on, the manufacturing cost of the rivets is less as a flat-head rivet can be produced at less cost.

However, the pressure applied to the rivet in driving must be controlled accurately and must not be sufficient to distort the work nor

to damage the structure of the rivet.

Practically all who have tried cold driving, at least in structural work, attempted to drive a button head on the rivets and used a compression riveter of the uncontrolled-pressure type. Those familiar with the fabrication of steel know that even when driving hot rivets there are times when the members are light enough to become bowed and warped due to excessive riveting pressure. In such work it is necessary to drive the rivets by hand to avoid distortion unless the riveter pressure is controlled automatically.

In attempting to drive rivets cold, this effect is intensified to such an extent that unless the members are exceptionally heavy for the rivets being used, cold driving is impossible with the common uncontrolled-pressure riveter.

When driving rivets cold with long grips, it is necessary to use close clearance holes so as to cut down on the length of rivet outside the hole and avoid bending. These small clearance holes are an advantage for easier driving in all cold driving, but until the rivet gets too long for satisfactory driving, the standard 1/16-inch nominal large hole is satisfactory. The close clearance hole in long grip rivets causes no difficulty as these are always reamed holes and they can be reamed one size as well as another.

These are the main reasons why the cold driving of rivets has been abandoned by many who have tried it. This also is the reason why so many are not acquainted with the benefits to be derived from cold driving when the rivets are driven properly.

The pressure required to cold drive rivets of different size varies according to the diameter of the rivet head. Thus not only should the pressure be the same on all rivets of the same size, but it must be possible to set the pressure to suit the size of rivet being driven. Otherwise unsatisfactory work will result and the riveter can not be used to drive more than one size of rivet. To adjust the pressure in the air line feeding a pneumatic

riveter to give the "squeeze" desired is not a satisfactory solution. This makes slow driving as it is difficult to get the last few pounds of pressure into the cylinder quickly. Also, with hand-manipulation of the riveter, it is almost impossible to get the final pressure uniform.

Inspection is very easy on cold driven work. A poorly driven rivet sticks out like a sore thumb and can hardly be missed by even a casual examination. Also any rivet that is good in appearance is always good and tight. Therefore, visual inspection is all that is necessary—even for government inspections which, as everyone knows, are rigid. This cuts down the time for inspection to a fraction of that required for hot driven rivets, which have to be tapped, and helps the shop and the customer.

To get the most from cold driving, the following recommendations

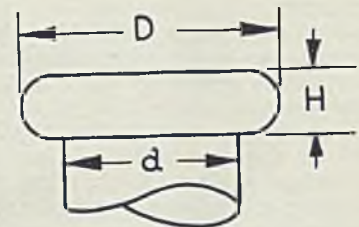


Fig. 3—Dimensions recommended for flat head to be driven on cold rivets. Here diameter of head D is 1.5 rivet diameter d . Minimum height H is 0.25 rivet diameter d

should be given careful consideration: The characteristics necessary in a riveter that cold driving may be done satisfactorily with it are as follows:

It must be so constructed as to allow automatically controlling the pressure applied to the rivet to the amount for proper driving. This must be an accurate control as small variations greatly affect the work.

It must have a "power stroke" 1/2 to 1-inch long, during which the pressure is reasonably constant. Preferably this should be 1-inch long.

It must have reasonably good fitting dies and die screw which will not wobble and throw the rivet offside. This is of course just as necessary for good work with hot driving, but hot driven off-side heads cause less trouble.

It must for economy utilize high line pressure and use only sufficient air to obtain the correct pressure on the rivet.

It must have high maximum



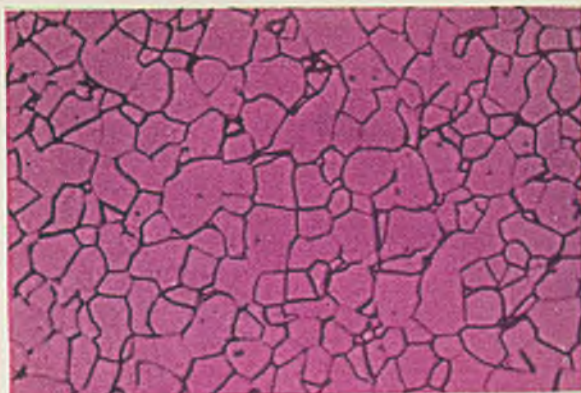
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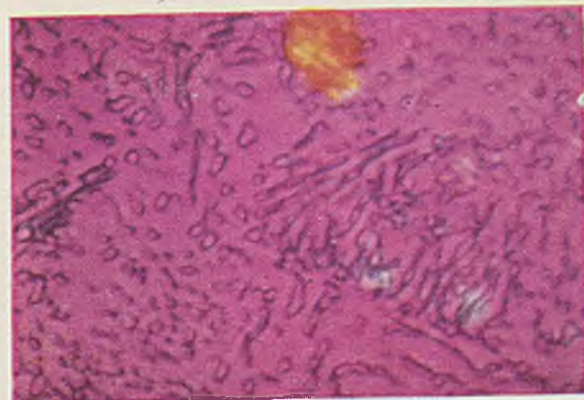
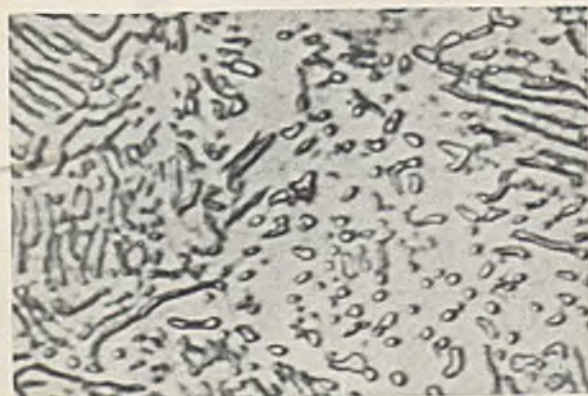


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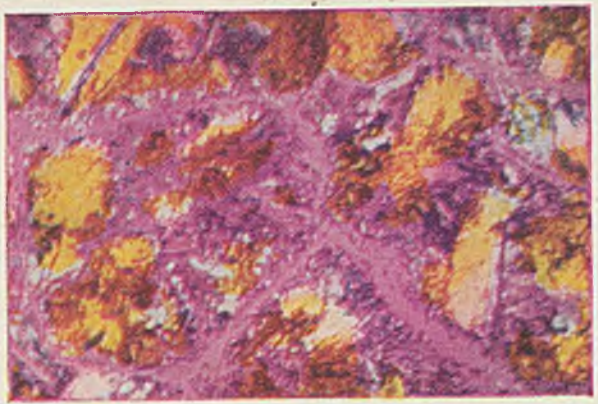
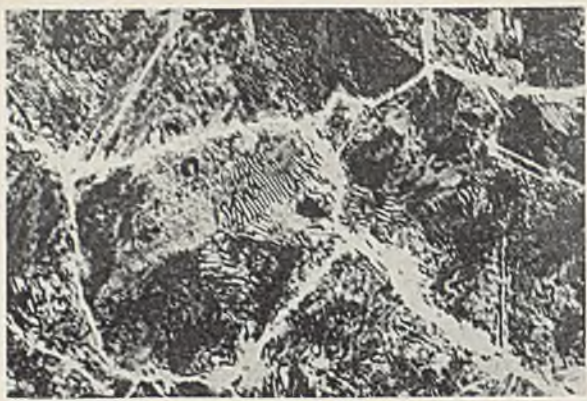
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A Comparison between ordinary light (left) and Sensitive Tint Illumination taken on Kodachrome film (right) on ferrite in low carbon annealed steel wire. Magnification 200X—Enlargement 2X.



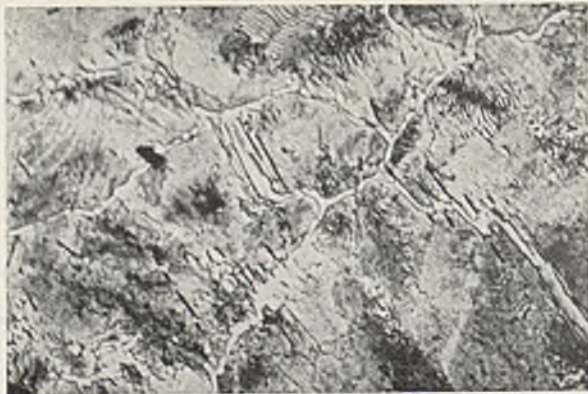
B Poorly spheroidized high carbon steel wire. Ordinary light (left). Sensitive Tint Illumination taken on Kodachrome film (right). Magnification 1000X — Enlargement 2X.



C Annealed Hyper-Eutectoid Steel showing cementite network. Ordinary light (left). Sensitive Tint Illumination taken on Kodachrome film (right). Magnification 200X — Enlargement 2X.



D Coarse Pearlite in high carbon patented wire. Ordinary light (left). Sensitive Tint Illumination taken on Kodachrome film (right). Magnification 1000X — Enlargement 2X.



E Pearlitic Grain Size in High Carbon patented rod. Ordinary light (left). Plane polarized light taken on Kodachrome film (right). Magnification 200X—Enlargement 2X.

Photomicrographs of steel in color as produced in the Wickwire Spencer Laboratories entail far more care, time and expense than are required in making black and white photomicrographs with ordinary light. But color reproductions show more, tell more and are of greater aid in controlling the various processes in wire making. They are another reason why users of Wissco Wire find

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speed—also for economy while a hot-driven rivet can be driven too fast, on account of necking producing loose rivets or rivets that will loosen in service, this does not apply at all to cold-driven rivets. The faster these are driven, the better.

It must be possible to quickly and easily change and adjust the pressures applied by the riveter.

It is advantageous to have two selective automatically controlled speeds of driving. These are needed especially when the riveter is suspended to get the best economy and quality. In approaching the rivet with the driving die, a slow speed must be used. For actually driving the rivet, the high speed is used. This will give a smooth action to the riveter, will assure good rivets and fast work.

Pressure Control: A diagram of the Osborne automatic pressure control system for a typical riveter is shown in Fig. 5. The main parts are the operating valve, M 862; pressure control valve, M 551; control cylinder, M 550; stop release cylinder, M 893; connecting rod, M 1010; cut-off valve, M 567. The function of the different parts is as follows:

The operating valve M 862 is a pneumatic valve controlling the motion of the riveter ram and die. The pressure control valve M 551 automatically causes the reversal of the riveter when the proper pressure is applied to the rivet. The control cylinder M 550 is a pneumatic cylinder which directly operates the main valve of the

TABLE I—Rivet and Rivet Die Dimensions for Cold Riveting, in Inches

Rivet Diam.	Rivet Head Diam.	Mfgd. Head Height	Height of Driven Head Plate	Height of Driven Head Struct.	Dimension A	Dimension C	Driving Die	Dimension D Buck-Up Die	Dimension E	Dimension F
$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{3}{16}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{8}$
$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	2	$1\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
$\frac{5}{16}$	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{5}{16}$	$\frac{5}{8}$	2	1	1	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$
$\frac{3}{8}$	$\frac{3}{4}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{4}$	$2\frac{1}{2}$	2	$1\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$
$\frac{7}{16}$	$\frac{7}{8}$	$\frac{1}{8}$	$\frac{7}{16}$	$\frac{7}{8}$	2	2	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$
$\frac{1}{2}$	1	$\frac{1}{8}$	$\frac{1}{2}$	1	$2\frac{1}{2}$	$2\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$
$\frac{5}{8}$	$1\frac{1}{8}$	$\frac{1}{8}$	$\frac{5}{8}$	$1\frac{1}{4}$	3	$2\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$
1	$1\frac{1}{2}$	$\frac{1}{8}$	1	$1\frac{1}{2}$	3	2	$2\frac{1}{4}$	$1\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$
$1\frac{1}{8}$	$1\frac{3}{4}$	$\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{3}{4}$	3	2	$2\frac{1}{4}$	$1\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$
$1\frac{1}{4}$	2	$\frac{1}{8}$	$1\frac{1}{4}$	2	$3\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{4}$	$1\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$
$1\frac{3}{8}$	$2\frac{1}{4}$	$\frac{1}{8}$	$1\frac{3}{8}$	$2\frac{1}{4}$	$3\frac{1}{2}$	3	$2\frac{1}{4}$	$2\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$
$1\frac{1}{2}$	$2\frac{1}{2}$	$\frac{1}{8}$	$1\frac{1}{2}$	$2\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{1}{4}$	$\frac{3}{4}$	$\frac{3}{4}$

riveter. The stop release cylinder M 893 is a pneumatic cylinder for releasing the catch on the piston rod of the control cylinder. The connecting rod M 1010 is the means of transferring the motion of the piston and rod to the main valve of the riveter.

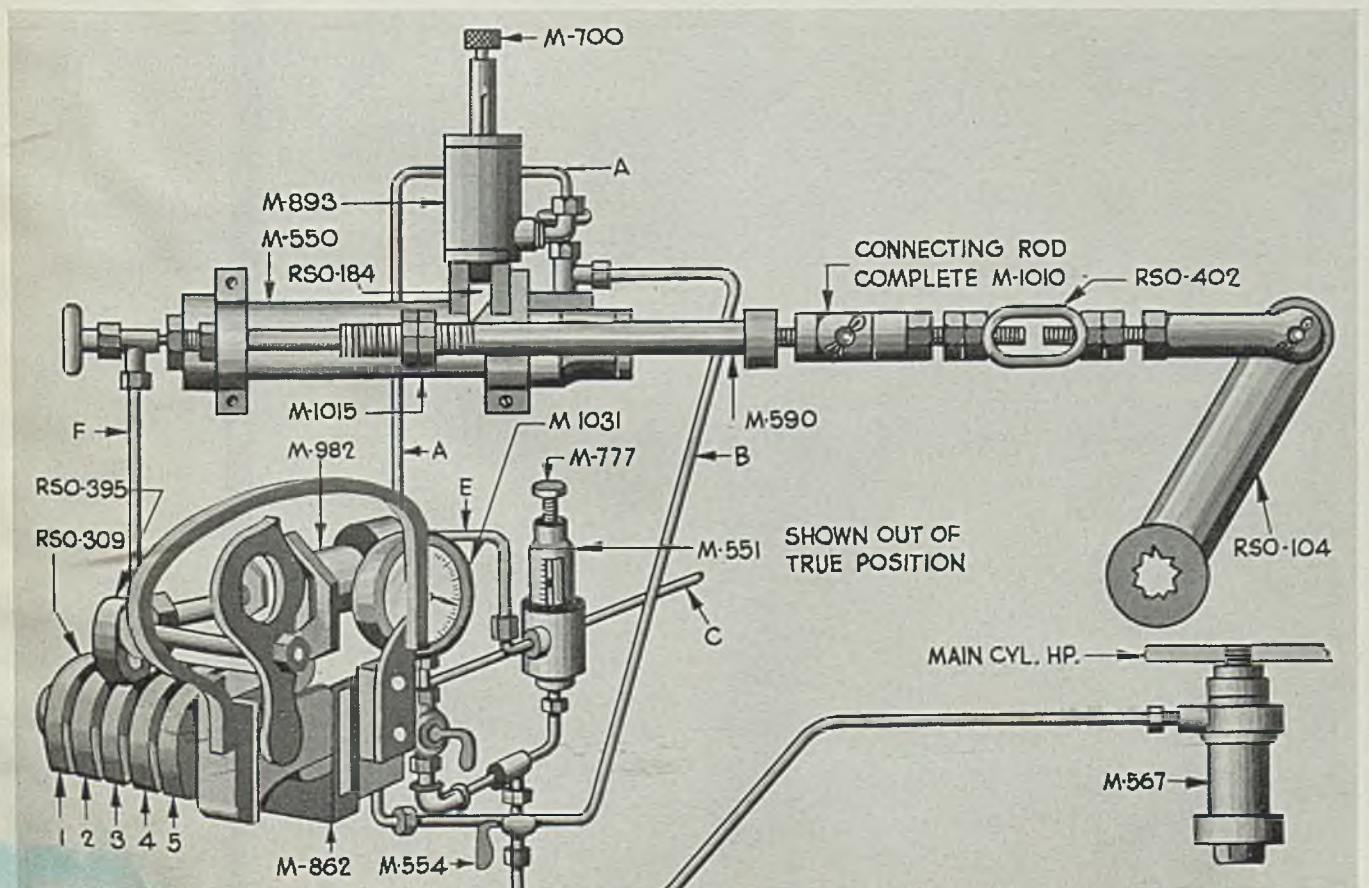
The cut-off valve, M 567, is used with riveters which have leaky main pistons. The leaking of pistons in riveters is so common through faulty design that it has been necessary to design this unit to overcome the effect of excessive leakage of the riveter piston that causes a back pressure on the wrong side of the piston. At times, this pressure is higher than the pressure required to drive the rivet. The function of this cut-off valve is to prevent this back pressure from acting on the automatic control apparatus.

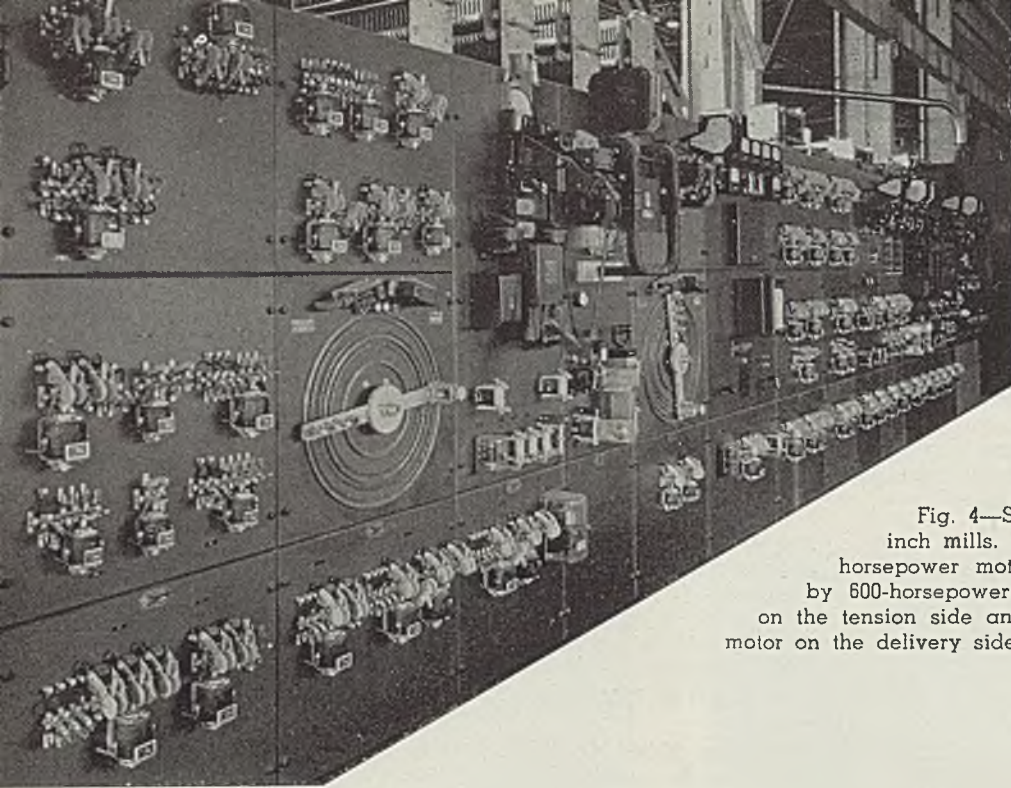
The control operates as follows: A short motion of the trigger (in front of M 982) toward the right causes a motion of the pneumatic piston in the control cylinder M 550 toward the right until the stop M 1015 engages the plunger catch RSO 184. A further motion of the trigger or lever to the right causes the withdrawal of the plunger catch and allows the free motion of the control cylinder piston toward the right. In the restricted position, the main valve of the riveter is opened by the motion of the connecting rod M 1010 and the valve arm RSO 104 only sufficiently to cause the "approach" speed desired for the particular work. This speed is regulated by the position of the stop M 1015 on the threaded rod attached to the control cylinder piston rod, and is automatically held to this speed.

In the unrestricted position, the riveter valve is opened wide or to

(Please turn to Page 87)

Fig. 5—Diagram of elements of the Osborne pressure control system for use in cold riveting work. Its operation is explained in the text

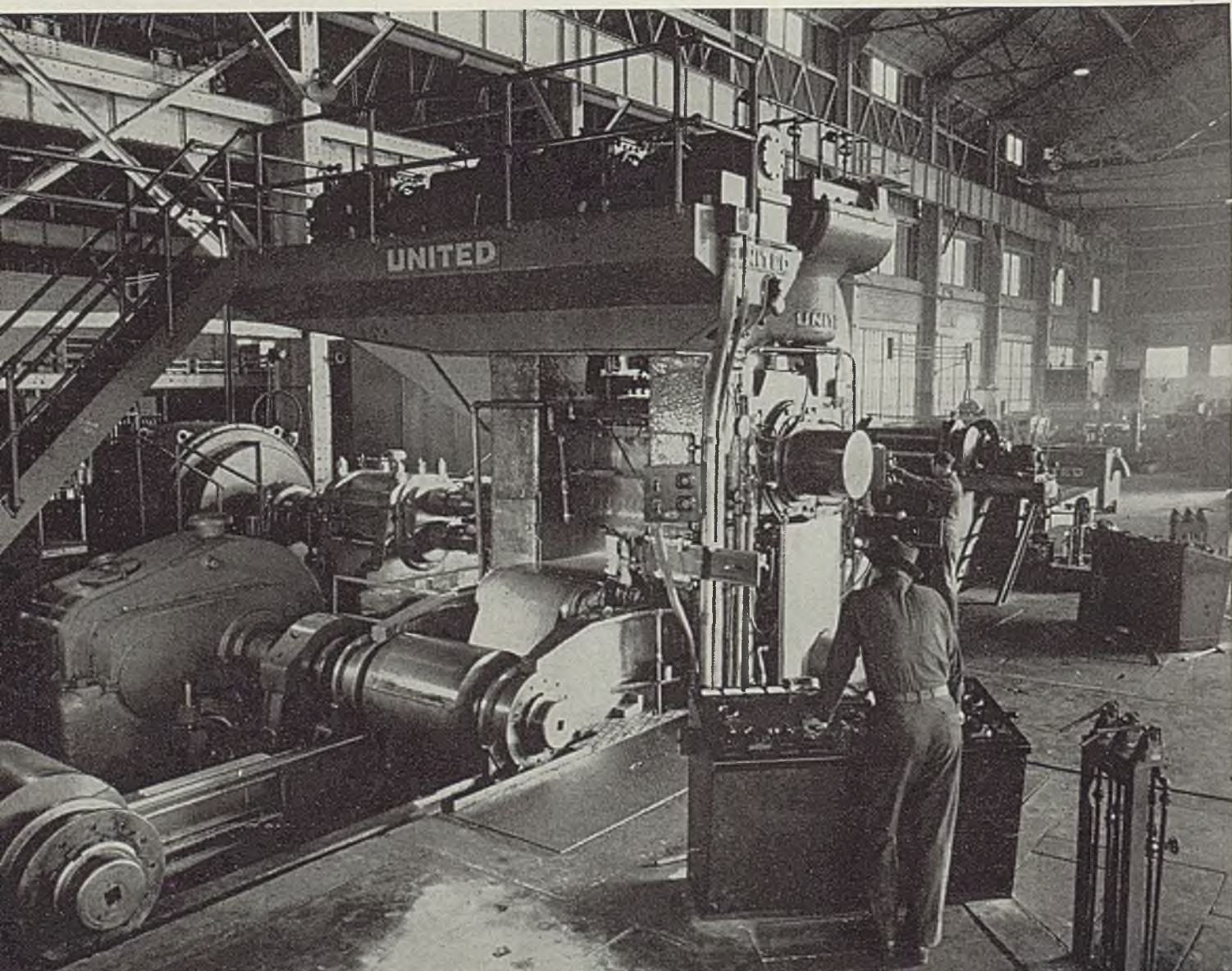




Rebirth

Fig. 4—Switchboard for one of the new 34-inch mills. Main drives are powered by 1500-horsepower motors. Temper mill rolls are driven by 600-horsepower units, with 150-horsepower motors on the tension side and delivery reel and 300-horsepower motor on the delivery side of the mill

Fig. 1—One of the two new 34-inch four-high reversing cold mills, which are duplicates. Each is capable of reducing hot-rolled strip furnished in coils 31 inches wide to sheet and tin plate gages at speeds up to 1570 feet per minute. At the extreme left is one of the bobbins, which are interchangeable, on either side of the mill



of a Steel Plant

A CASUALTY of the swing from hand sheet mills to the continuous mill, from hot-rolled items to cold-reduced products, Follansbee Bros. Co., Pittsburgh, with mills at Toronto, O., and Follansbee, W. Va., went through 77-B and emerged as the Follansbee Steel Corp. last year. Included in the renaissance was a \$1,270,000 modernization program which in its many ramifications represents one of the best efforts to date of a small semi-integrated steel producer to meet the threat to its existence arising from technological advances requiring vast capital expenditures to consummate.

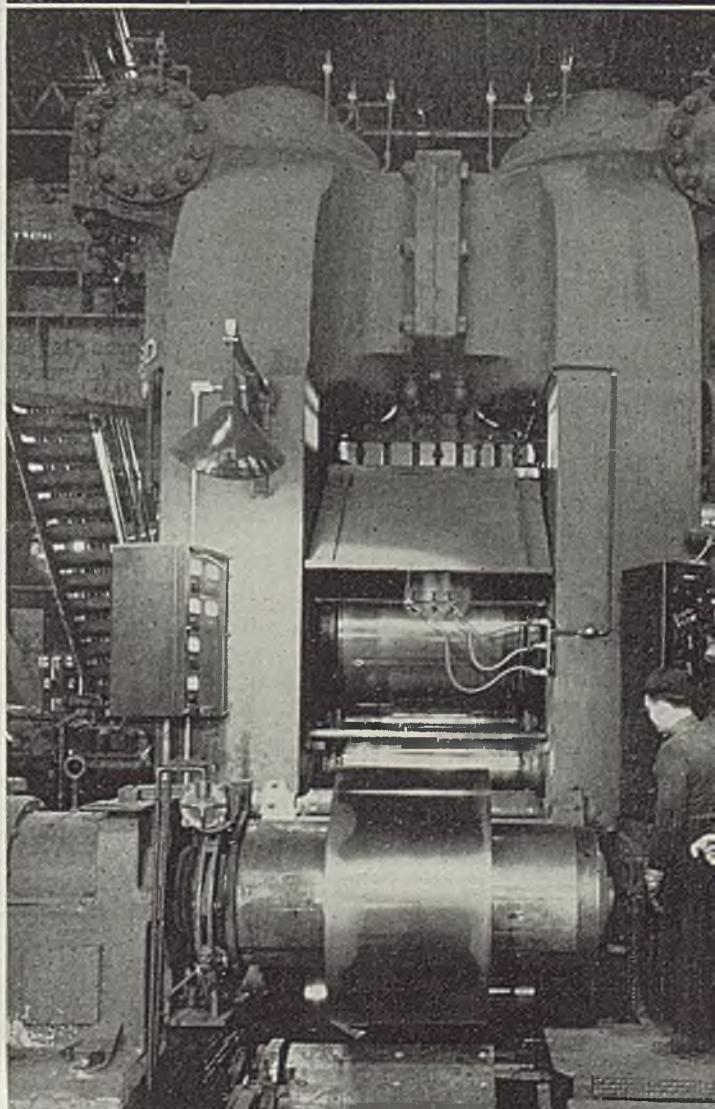
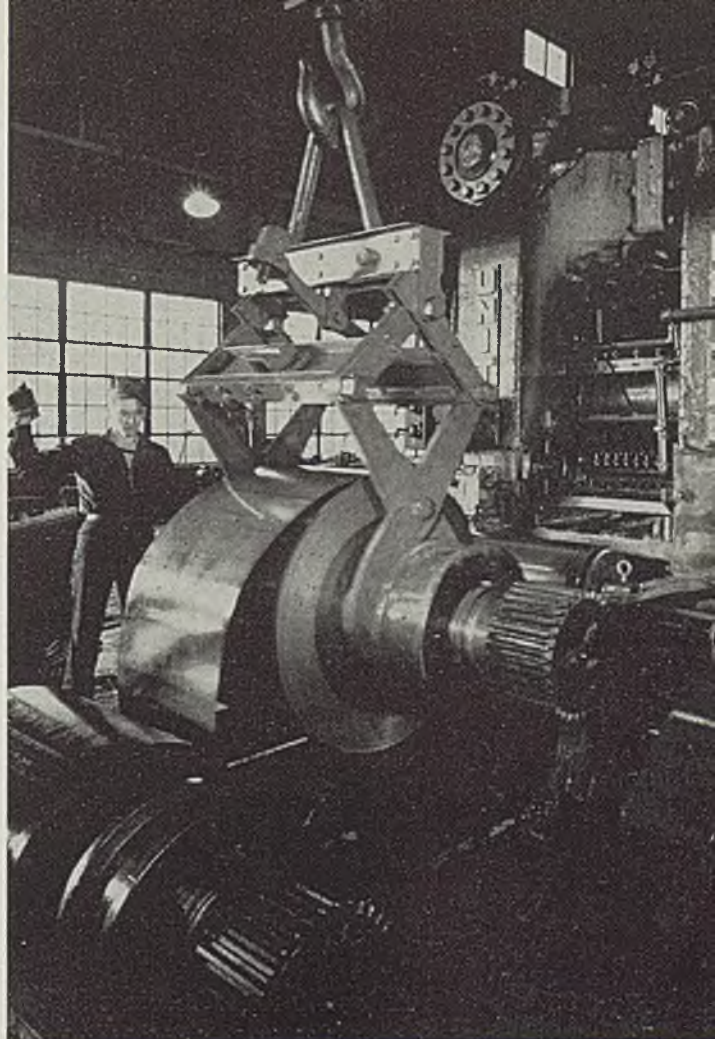
Much of the work of rebuilding the physical assets of the company was done by its own employees. Much of the material involved was salvaged from older buildings and equipment. New buildings were erected on the sites of old, antiquated equipment was cleaned out and its space utilized by units of the new mill. Of particular interest in the revised setup is the arrangement whereby integrated stripsheet mills will supply hot-rolled strip in coils for cold processing by Follansbee, thus eliminating the terrific expense of a continuous hot mill. However, hot-mill facilities have been retained from the former layout to provide adequate capacity to handle the many specialties for which the company has been a recognized source for many years.

The original plant buildings have been rebuilt and extended to house the two new cold mills, the temper mill, and the Steckel mill which has been rebuilt. Four small open-hearth furnaces were torn out, materials salvaged wherever possible. Right wing is coil storage section, larger bay housing the cold mills.

Output of the new plant will be 20 per cent higher than before, although the character of the products is entirely different. A large majority of the finished steel will be cold reduced, whereas the old mill turned out principally hot-rolled products. Most of the hot-rolled products will be specialties by nature, including principally electric steel sheets, charcoal tin plate and hand-mill terne. Cold-reduced products include tin plate, black plate, sheets, seamless terne roofing and long terne plate.

Fig. 2—After the strip has passed through the mill, top right, tongs pick up the loaded bobbin and take it to the recoiler. The two new cold mills are located 320 feet apart. Additional new facilities operating in conjunction with these mills include a new cutting line with feed roll, pinch rolls, slitter, leveller, reciprocal-type shears, piler and conveyor

Fig. 3—The new four-high temper mill, 18½ and 49 inches x 42 inches, is capable of skin passing material in widths up to 36 inches at speeds up to 2350 feet per minute. This mill and the new cutting lines are located in the former cold-reduction building



How to Obtain

High Eccentricity in Light-Walled Tubing

By ROSS McLAREN

Superintendent Tube Mills
Timken Roller Bearing Co.
Canton, O.

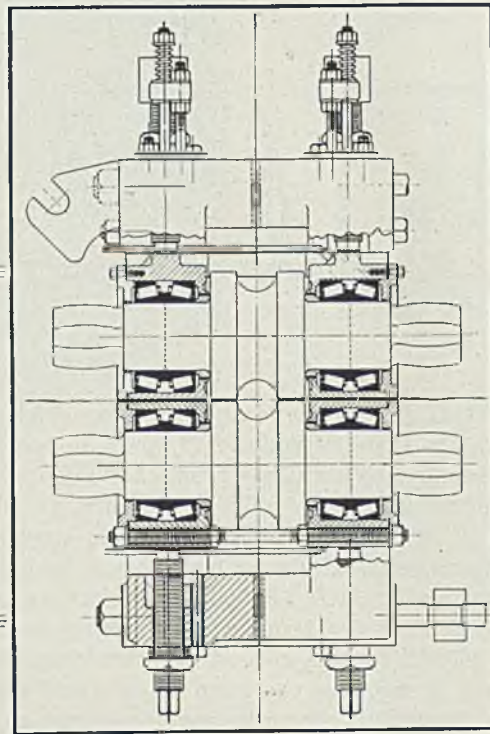


Diagram showing application of tapered roller bearings to tube reducing mill

One of the common reasons for the rejection of light-walled hot rolled tubing is the presence of ridges on the interior. By equipping the mills with roller bearings it is now possible to reduce tubing to 1-3/4 inches outside diameter and to eliminate the ridges. The accompanying article explains how this is accomplished

■ IMPROVING the product of the No. 2 tube reducing mill at the Timken Roller Bearing Co., Steel and Tube division, Canton, O., has been accomplished by the installation of tapered roller bearings. This mill consists of two tandem mills, each having bases for 16 mill stands. In reality it is two complete tube reducing mills. A total of 120 mill housings have been equipped with roller bearings on each roll neck. While 32 mill stands may be in the mill at one time, the remaining roll stands are assembled complete with bearings and rolls to permit frequent and quick changes in rolling schedules. Each tandem mill is driven by a 500-horsepower variable-speed motor with a speed range of 400 to 800 revolutions per minute.

Timken bearings, consisting of a double row cone and two single cups are applied directly to the roll neck and mounted into the bearing chock, as illustrated. Bearing adjustment is obtained by means of thin metal shims between the bearing chock and cup follower. With the bearings mounted in the chock this complete assembly may be slipped on to the roll neck easily. The annular groove closure has

proved effective in sealing off the bearing chamber from mill water and scale. The bearings are grease lubricated.

Tubes with a 5-inch outside diameter are the largest this mill can take. With plain brasses in these mills it was impossible to consistently make a good 2-inch outside diameter, 10-gage tube. Trouble with tube eccentricity and ridges in the inside diameter was usually encountered. Obviously the presence of ridges in the tube inside diameter is reflected in high eccentricity which is a common reason for rejection of this light-walled, hot rolled tubing. As a result of equipping these mills with roller bearings it is now possible to reduce tubing down to as low as 1 3/4-inch outside diameter, 10-gage, and in so doing to obtain an excellent product with regard to eccentricity and with almost complete elimination of ridges.

The credit for this is due to the ability of the roller bearing to maintain accurate pass alignment at all times. The centerline of succeeding mill passes are alternately inclined one to the other so that the roll partings are not all in line; that is, the

rolls are not horizontal, but alternately inclined to the horizontal. With this condition it is difficult to keep mill water from carrying mill scale, dirt, etc., into the lower plain bearing of each roll. The wear resulting causes the pass to open up eccentricity. Wear is almost completely eliminated in the roller bearing chock, hence the rolls are held permanently and positively in correct relation one to the other.

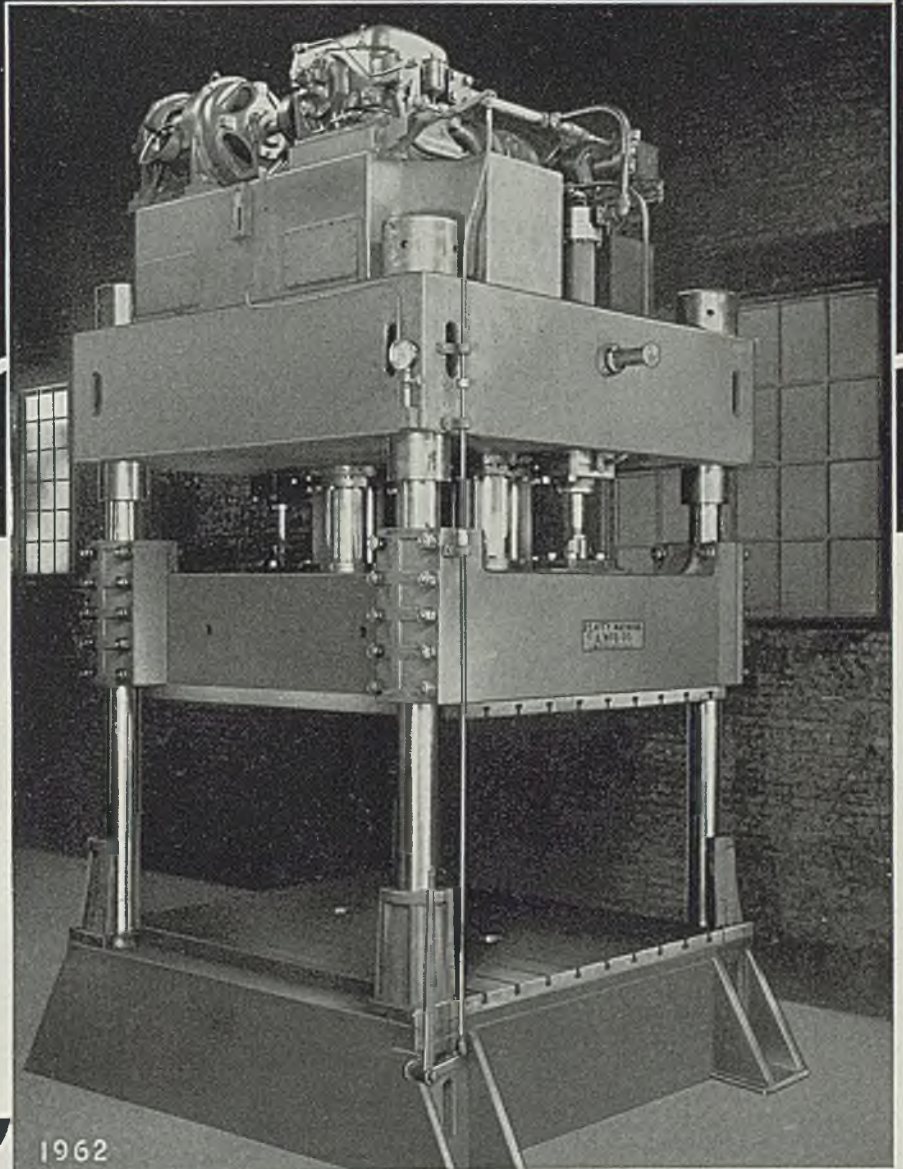
Accurate Adjustment Desired

An effort is made to accurately set up the rolls in each mill housing before the mill housing is placed into operation. This may be better accomplished with tapered roller bearing equipped chocks than with ordinary brasses as tapered roller bearings can be adjusted within closer limits of running clearance and thus practically all external looseness removed. This fact explains why fewer tubes must be run through the mill when equipped with tapered roller bearings than when equipped with plain brasses before a quality product is obtained. Mill adjustments and general shut-down delays have been reduced to a minimum since changing over this mill from plain bearings.

While, of course, there is a power saving effected by applying roller bearings to these mills, the amount is low for the reason that bearing loads encountered in "sinking" or reducing are light. This operation consists primarily of reducing the size of tubes, which offer little compressive resistance as compared

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Equipment

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Above is shown a 600-Ton Hydraulic Press recently installed in one of the large progressive railroad shops for all types of pressing and forming of car parts. It incorporates all of the features so desirable for miscellaneous press work, such as stroke control, variable pressing and rapid traverse speeds, all regulated by one manual control lever. Removable tee slot plates allow for redressing of platent surfaces without dismantling Press. These features are included in all BEATTY Presses.

Write for bulletins describing this and other types of presses and let BEATTY'S Engineers assist you with your problems.

BEATTY MACHINE & MANUFACTURING COMPANY
MAIN OFFICE AND WORKS: 150th AND OAK STREETS — HAMMOND, INDIANA

to reducing a solid bar of comparable outside diameter.

Due to light work loads the life of bearings will be extremely long. During 1937, 1938, 1939 these mills operated a total of 13,348 hours, and of this time it is estimated that brasses were in the mill for 4004 hours. In other words, the charges for brasses amounted to \$0.3426 per hour of operation, as during these 4004 hours there was a charge of \$1372 for brasses and machine work on these brasses.

It is also evident that considerable saving in lubricant has been effected since applying tapered roller bearings to this mill, but just what this amounts to cannot be determined from available records.

Gas Association Meeting

(Concluded from Page 67)

uniformity is also within the limits specified above." He also stated that there is a large demand for ovens of the recirculating type for heat

treating and aging magnesium and aluminum alloy castings. The temperatures in these processes range from 300 to 960 degrees Fahr., the soaking time varying with the alloy and cross-sectional area of the work. These jobs require very uniform temperature distribution as well as close temperature control.

A new furnace which recently proved highly successful in conducting research work on armor plate was described by P. C. Osterman, American Gas Furnace Co., Elizabeth, N. J. According to Mr. Osterman, this new unit, the Bell-oven furnace, is his company's conception of the ideal way to apply protective atmospheres in batch heat treating. The alloy bell is linked to the door mechanism so that as the door of the furnace is opened the bell rises from its sand seal on the hearth and permits the operator to charge or discharge freely, while, when the door closes, the bell reseats itself to provide full muffle protection around the work.

This furnace was used in the research work done on armor plate,

employing a new method of heat treating which surprisingly increased the resistance to penetration of the armor plate. It also has proved desirable in the hardening of stainless steel airplane parts, particularly the mast-ends. Study shows that this furnace has an extremely wide range of applicability—namely, for heat-treating operations within the limits of Nichrome such as annealing, drawing, hardening, carburizing, nitriding, Ni-Carbing, brazing, which can be carried out under close control.

Reporting on temperature controls, Alvin M. Stock, vice president, Partlow Corp., New York, briefly described several of the newest type controls now available for furnaces. He stated that today controls are a dire necessity. The rearmament program has already made new and more exacting demands upon industrial controls and what the final results of these demands will develop into is a matter of conjecture at present.

Other participants in this symposium included Slade Gamble, National Machine Works, Chicago, and O. N. Sellers, Sellers Engineering Co., Chicago.

A new application of direct radiant gas heat to ceramic firing was described by Frederick O. Hess, the Selas Co., Philadelphia. This installation is a large tunnel kiln built for the manufacturers of Lennox china and is the first of its type.

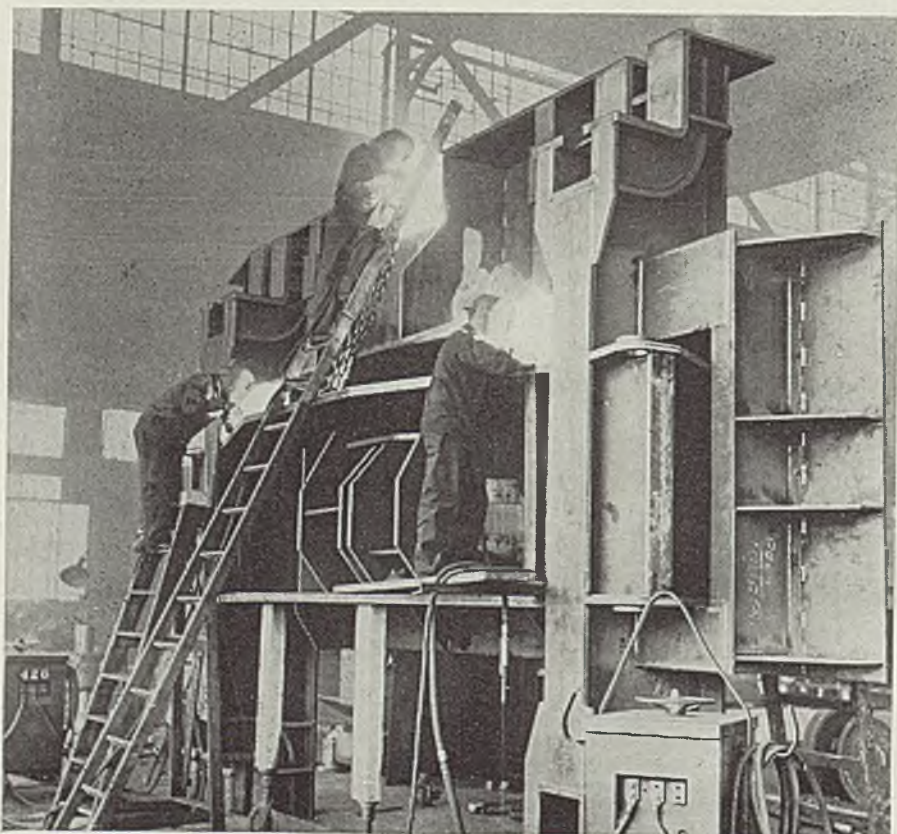
Pointing out that industry and business used 53 per cent more gas in 1940 than during 1929, Alexander Forward, managing director, American Gas Association, predicted at the conference that the consumption of gas would continue to grow when the period of adjustment, following present defense efforts, arrives.

Announces Ignition Tube For Welder Control

■ A new ignitron tube, type GL-415 for resistance-welder control, utilizing a unique water-cooling system, is reported by General Electric Co., Schenectady, N. Y. It depends upon a special clamp into which it is fitted for its cooling. Consisting of a brass block with water passages, the clamp not only serves as a cooling medium but also as the cathode connection.

A pair of these tubes is capable of controlling 265 kilovolt-amperes of resistance-welding load on a 5½ per cent duty cycle. They can be used at reduced rating with air cooling, when desired. With suitable control, the tubes also can be used for accurate, short-time welding.

Huge Welded Frame for a 150-Ton Crane



■ Shown under construction at the plant of Cleveland Crane & Engineering Co., Wickliffe, O., is an all-welded trolley frame for a heavy-duty steel mill crane of 150-tons capacity to be used in connection with heavy defense work. Numbered among the world's "largest", it alone will weigh 32½ tons and have an overall length and width of 23 feet 5 inches by 15 feet 6 inches. Two hundred and seventy-six pieces of various thicknesses varying from ¾ to 2 inches are being welded together. When transformed by welding into a one-piece unit, the frame will be machined in the same manner as a huge casting



One of a fleet of 12 "Clarkats" used in the Colorado Fuel & Iron Company's wire mill at Pueblo, Colo.

CLARKAT

pulls 40 tons on trailers at 8 m.p.h.

Nimble in traffic, "Clarkat" turns on a dime, climbs ramps, whips trailer trains through the plant at safe, efficient speeds. Easy to operate. Twin wheels at the bow provide stability. Steel turret top protects driver, motor and tires. Gas-powered for 24-hr. uninterrupted operation.

Bulletins on Industrial Tractors

Write for bulletins on 3-wheeled "Clarkats" and the more powerful 4-wheeled, 6-cyl. "Clarktors"—a wide range of capacities, up to 85 tons.



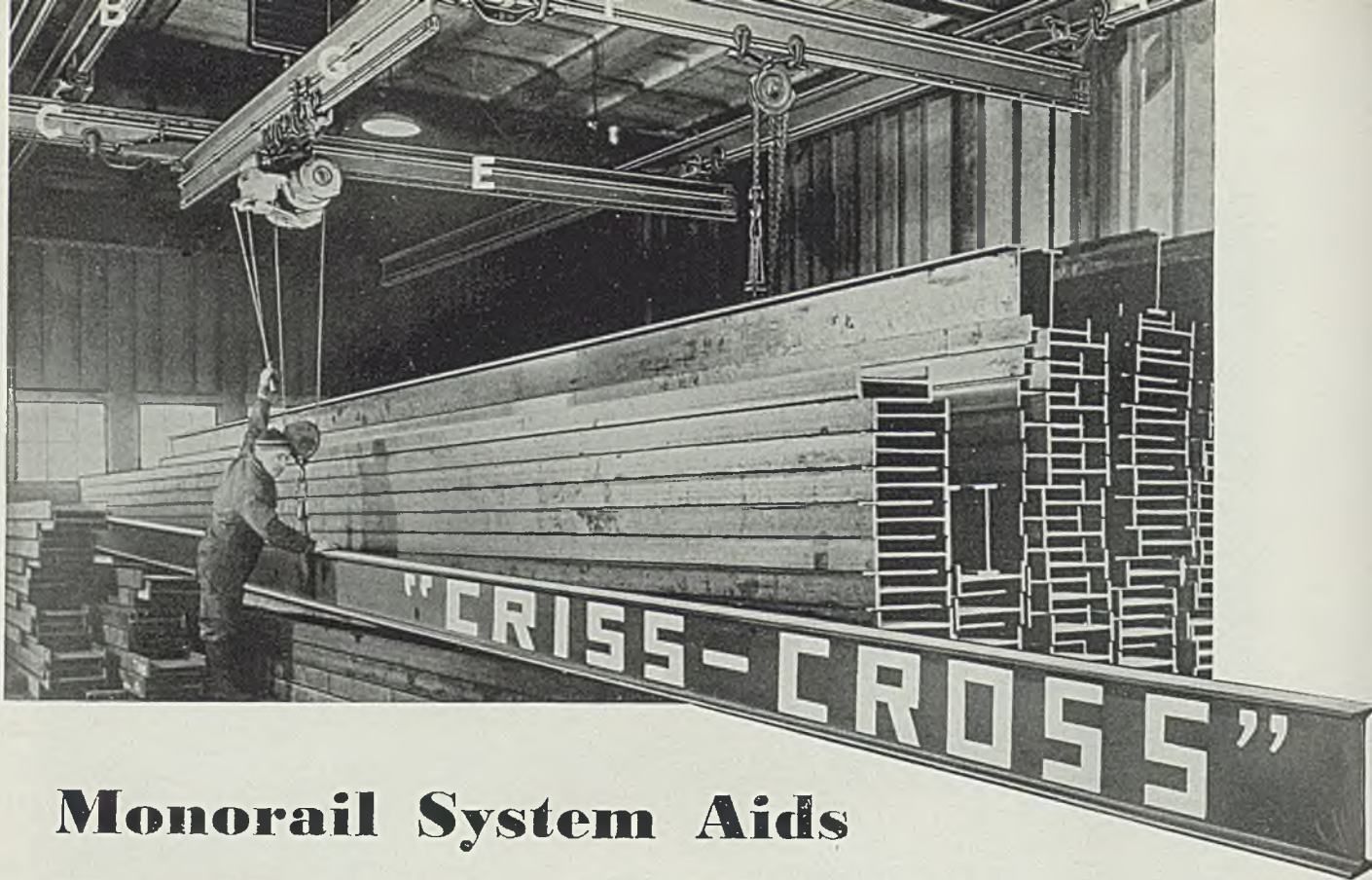
CLARK TRUCTRACTOR

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CLARK TRUCTRACTOR

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Monorail System Aids Handling in Small Plants

See how a newly developed system of rails, cross rails and bridges with extension jibs produces a low-cost handling arrangement that is extremely flexible; can cover nearby outside railroad track and truck loading docks; permits passing of loads inside plant; easily moves loads about work areas

■ A NEWLY developed system of monorail bridges affords an extraordinarily efficient means of handling in small plants where a large investment in overhead handling equipment might not be warranted. For a number of years the area covered by a monorail hoist has been limited to the distance between the rails which supported the bridge or cross rail carrying the hoist. One departure is to utilize a section of monorail track as a jib. But the area covered then is limited to the arc or swing of the jib.

However, if two jibs are employed

By F. C. HARRIS

Chief Engineer
American MonoRail Co.
Cleveland

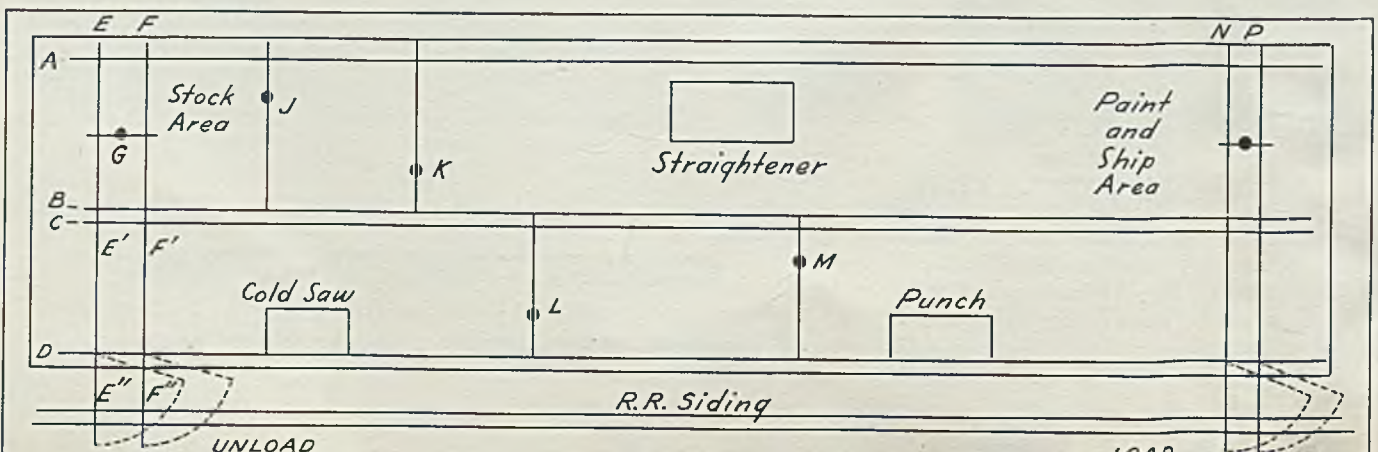
and a cross rail or bridge run out on them, greater coverage can be obtained and more flexible and

faster handling results. This is one of the novel features of the "criss cross" monorail system developed by American MonoRail Co., Cleveland. With such a section latched in line with the main track, the monorail bridge can be run out over railroad tracks and other areas to facilitate loading and unloading operations.

An excellent example of the great flexibility afforded by such a system is seen in the new building recently erected at the Cleveland plant of American MonoRail Co. for fabrication of heavy-duty rails for its RailMaster track. When a new building is constructed for a specific

Fig. 1—Plan or layout diagram of handling facilities provided in new shop by the criss-cross monorail system. See view below

Fig. 2—Criss-cross or 3-level monorail system is shown clearly above. View is at storage area immediately opposite unloading dock. A, B, C, E, F, G coincide with similar labels on elements in Fig. 1



purpose, it is possible to locate the machinery and to design the materials handling equipment for most efficient operation. This is exactly what was done in this instance.

Four rails, A, B, C and D, Fig. 1, run lengthwise of the building in this long rectangular plant to form two sets of runways. On each runway, six bridges carrying hand or electric hoists are available. Also, two jibs near each end of the building carry a bridge equipped with an electric hoist which works on the lower or monorail section of the bridge, see Figs. 2 and 3. This bridge operates from the jibs directly into a pair of transfer cranes in the building.

Equipped for Building Rails

The general layout of the plant and the materials handling facilities as well as fabricating equipment are shown in Fig. 1. This building was erected especially to fabricate heavy-duty rails, and for this purpose includes a cold saw, a straightener and a punch as well as facilities for welding assemblies together and for painting the completed rails.

Fig. 2 shows the elements in the 3-level "criss-cross" monorail system employed at each end of the plant to handle loading and unloading operations respectively. Three of the four rails running longitudinally through the plant—A, B and C—are shown by these letters in Fig. 2. These are at the top level. At the second or intermediate level are shown the two cross rails or cross bridges, E and F, Fig. 1, which are interlocked with two other cross bridges, E' and F', on runways C and D. These in turn also interlock with two jib rails, E" F", which extend out from the side of the building over the railroad siding. These jib rails, E" and F", are shown in Fig. 3 where completed track sections are being loaded into open freight cars.

Fig. 3 shows the jib rails in the position employed for loading and unloading operations. To permit passage of locomotives and box cars, the jib rails can be swung along side the building. To do this, pivots are provided at inner ends of the rails and also in their overhead supporting structure. To swing the rails against the side of the building it is only necessary to remove the angle iron piece which extends diagonally across the jibs. Then they can be swung against the building by means of the trailing rope seen in Fig. 3. Similarly, when it is desired to extend them out from the building, they are swung out at right angles to the building and the diagonal bracing put in place to hold them securely in position. Note cross braces just above the roof on the overhead structure near the pivots serving as stops to prevent

the jibs from swinging past the 90-degree point.

As will be seen by referring to Figs. 2 and 3 and the layout diagram, Fig. 1, this system affords an exceptionally high degree of facility in handling. It is possible to pick up material from a freight car outside the building and to deposit it at any point in the building. Of course in actual use the space inside the building opposite the jib rails is utilized as storage area, and it is this area that is shown in Fig. 2 for here the rails are stored as they are unloaded.

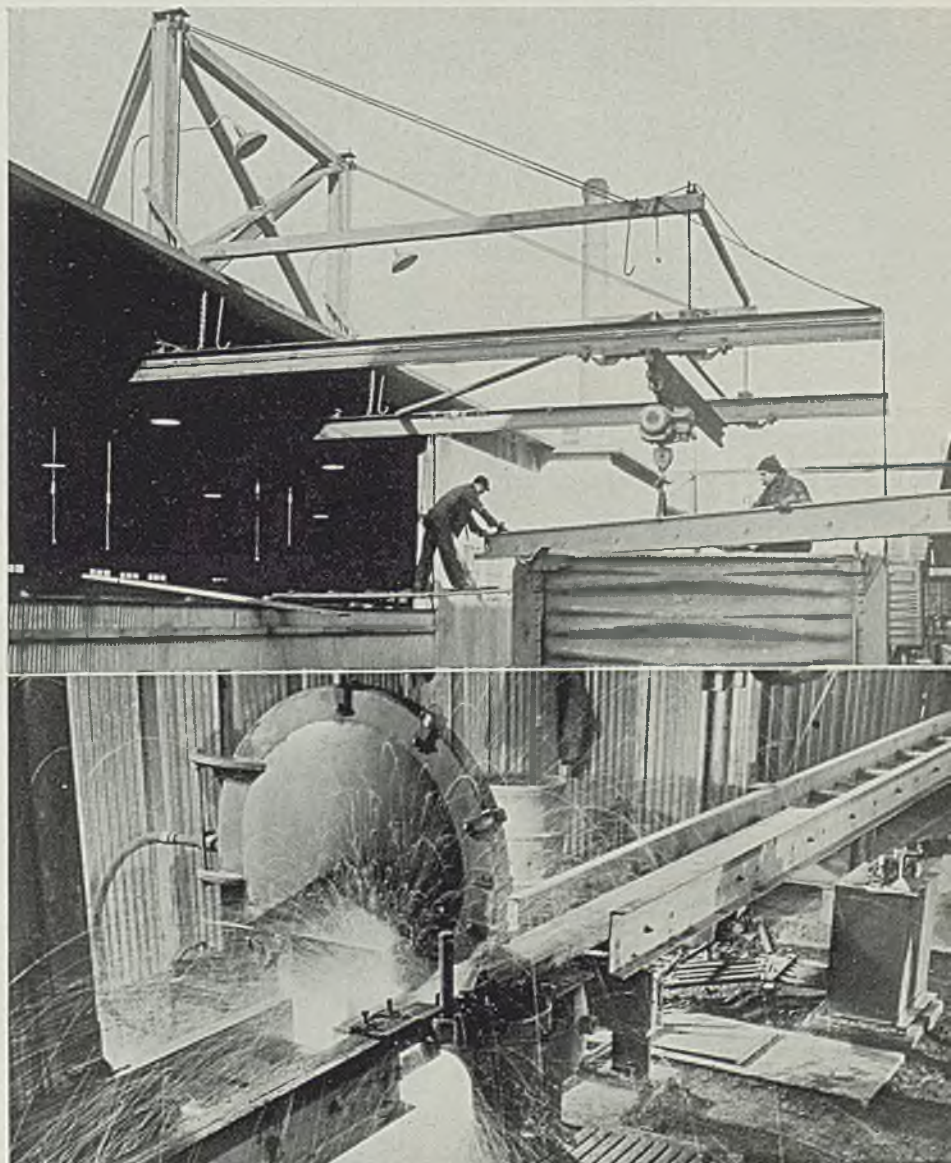
Fabricating operations are quite simple. The rails as received at the plant are of several sizes, but a 4 x 12-inch size weighing 25 pounds to the foot is used for making the company's so-called RailMaster track shown being fabricated in the accompanying illustrations. Rails

received are 40 to 50 feet long. The first step is to cut them to length desired on the cold saw, Fig. 4. This consists of a steel disk about 40 inches in diameter and $\frac{3}{8}$ -inch thick driven by an electric motor at high speed. In fact, the peripheral speed exceeds 20,000 surface feet per minute. The disk sets up an intense amount of friction at the point of contact, actually melting its way through the structural section at high speed. The cutting action comes from this intense friction at point of contact. The white-hot minute globules of metal thrown out are strikingly shown in Fig. 4. Cutting is quite rapid as a 4 x 12-inch high-carbon steel rail is cut in about 23 seconds.

Note in Fig. 4 the provision made to handle the rail. Extending for some distance on each side of the cold saw is a series of roller con-

Fig. 3—Outside view of loading area where finished rails are being placed in gondola cars for shipment using the same monorail system that handles the work inside the plant. The two sets of jibs can be swung out from the building and locked in place to permit monorail bridge to travel out over tracks. Note top view

Fig. 4—Illustration at the bottom shows the cold saw as it rapidly cuts its way through a channel section, the first step in making the rails. Note the roller tables to facilitate positioning the work



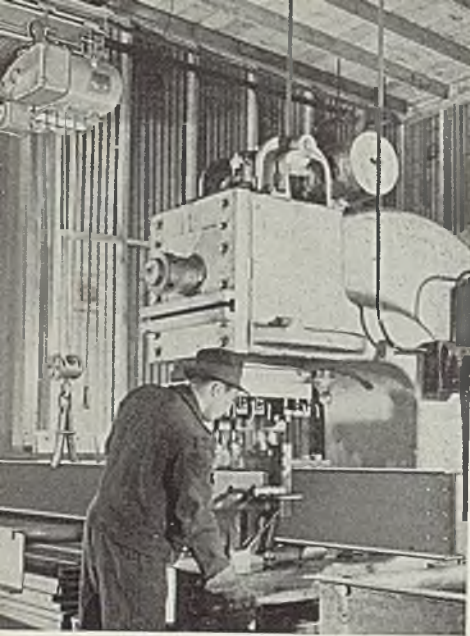


Fig. 5—All units are served efficiently by handling equipment. Here the punch has roller tables on each side of it. Of course the overhead monorail system also covers the area

A wide variety of rail section assemblies is made in this plant. One of the variations is shown in Fig. 7. These rigid rail structures are made by welding together suitable rolled sections including I-beams, U-channels and H-sections as well as smaller structural angles and bars. Most of these welds are made by the skip-weld method since it is not necessary to deposit a continuous bead. All welding is done with a metallic shielded arc using direct-current welding machines.

Note in Fig. 7 the tongs by means of which the rail section is suspended. This same tong method of load-

ing is also seen in use in Fig. 3.

Last operation in the fabricating shop consists of painting work to afford a protection against rust during shipping and in use. The paint, a red lead compound, is sprayed on as shown in Fig. 7. Note the operator wears a respirator while an exhaust fan in the right background carries away paint fumes.

Shipping is a reversal of the process employed in unloading the rails, Fig. 3 showing the loading operations utilizing another set of jibs swung out from the side of the building over the railroad cars. The completed rail sections are picked up on an electric hoist and run out on the overhead track terminating in the two jibs, which permits a finished rail section to be deposited on the gondola cars for shipment. An ordinary single jib monorail extension can serve only a limited

veyors with siderails to keep the work from sliding off the rollers.

Fig. 5 illustrates the next operation, simultaneously punching six holes at the end of the web. A section just punched is shown moving through the machine in Fig. 5. This same machine also punches flange holes for support connections. As all holes in rails and flanges are produced in the same punch and die setup, obviously they all will align correctly, which is the condition sought to facilitate assembly of the units. This is an important feature as the units are assembled in the plant where the equipment is being erected, and incorrect alignment of any parts would cause delay.

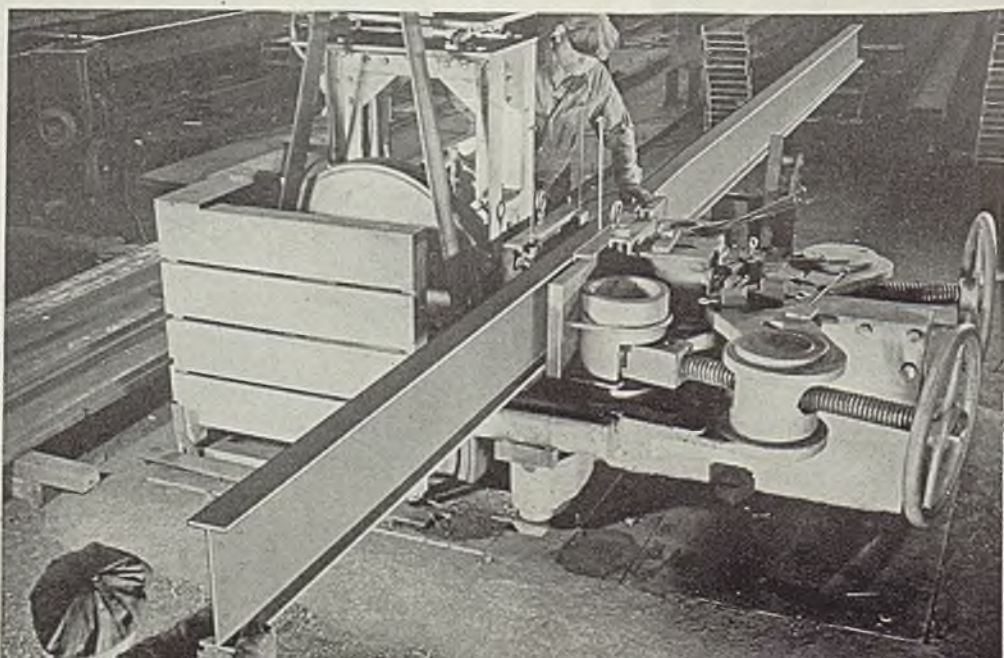
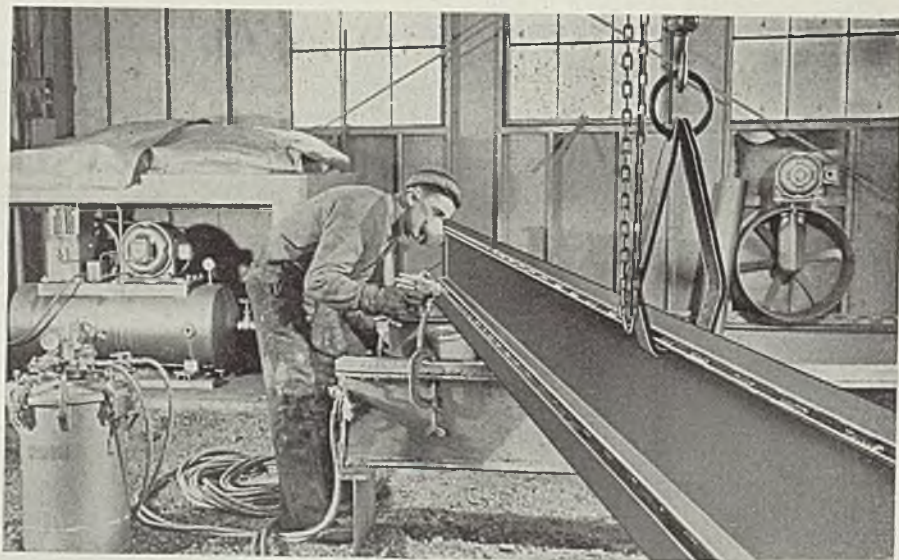
The punch unit shown in Fig. 5 is a heavy-duty geared crank press driven by an individual 15-horsepower electric motor. It can punch as many as 2 holes of $\frac{3}{8}$ -inch diameter in material $\frac{3}{4}$ -inch thick at one setup.

For handling work at the punch, a set of roller conveyors is provided on each side of the working station. Also the overhead monorail system covers this section as well as all other sections of the shop. Part of the overhead monorail with an electric hoist is shown in Fig. 5.

Since the rails must be perfectly straight so the finished installation will function properly, it is necessary to remove slight kinks or bends in some of the rails, although they generally come from the mill straight. Unusual care is required to make a smoothly operating monorail system. Fig. 5 shows the setup employed to straighten rails when this is necessary. The rail is confined between two adjustable supports, and mechanical pressure is brought to bear on the correct point. Handling equipment provided here consists of a group of fixed rollers at the feeding end of the machine supplemented by hoists on the overhead monorail system.

Fig. 6—Since it is important that the rails be perfectly straight, this bulldozer, bottom view, is employed to work out any irregularities in the sections

Fig. 7—After the rails have been assembled by welding the parts together they are spray painted. The special hook hung on a swivel from the overhead hoist makes it easy to hook onto the rail sections. See top view





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REPUBLIC—Alloy Steels

area. However, by utilizing two jibs with a cross rail between them as is done here, it is evident that the scope of the handling equipment is greatly increased.

The two sets of jibs on the outside of the building, one at the unloading position and the other at the loading position, together with the four longitudinal overhead tracks in the building and 12 cross tracks or bridges that operate on them, equipped with both power and hand hoists, permit quick transportation of the work about the shop, easy spotting, safe handling and maximum use of all floor space. Present average capacity of this department is a carload of finished rails per day.

This low-cost and efficient handling system greatly facilitates the work since all operations involve handling tasks too heavy for the unassisted worker.

How To Save Zinc

(Continued from Page 57)

sibly 3.25 per cent iron; between 850 and 875 degrees Fahr. the dross will carry from 3.25 to 3.75 per cent iron; around 900 degrees, from 3.75 to 4.25 per cent; at 950 degrees, up to 6.00 per cent iron; and at 1000 degrees and over, the dross will carry 6.00 to 8.00 per cent iron. Thus the iron content of the dross indicates the temperature at the bottom of the pot. Since the average bath temperature is about 860 degrees Fahr., the average dross should con-

freezing of the dross before the zinc has had a chance to get out of it. The conditions causing such heavy losses are: First, the dross spoon is not deep enough; second, it is not filled with enough holes; third, it is not large enough.

Ideal Dross Spoon: This condition of a high metal loss may be best illustrated by comparing the two extremes of dross spoon design—a broad shallow flat spoon with only a few holes in it as against a deep compact spoon with many holes in it. Zinc melts at 786 degrees Fahr. Dross in some cases will freeze at 800 to 820 degrees Fahr. depending upon speed of cooling and iron content. Dross in a shallow spoon is spread out like a "pan cake" and cools very rapidly to freeze quickly, thereby trapping large quantities of good metal. With a deep compact spoon, the mass effect of the metal keeps it hot and molten for a much longer time. If the spoon only has a few holes, it is evident that the metal cannot escape readily. If the spoon is filled with holes, the metal can escape quickly. A good dross spoon, therefore, should be at least 6 inches deep and should be filled with holes.

Freezing in Dross: The old hand method of taking a spade and cutting the dross with the edge and allowing the metal to escape is very inefficient as only an extremely small part of the good metal is reclaimed. Most of it freezes in the dross. The modern method of efficiently and quickly removing the

speed and submersion time. Each one of these factors involves a definite galvanizing principle:

The higher the bath temperature, the heavier the zinc coating that will be deposited.

The faster the articles go through the bath (metal ware and other hand-dipped articles), the heavier the zinc deposited as a coating. There is a correct galvanizing speed for every article to give the lightest and best zinc deposit.

The shorter the submersion time in the zinc, the lighter the zinc deposited as coating. There is a right submersion time for each article to give the best coating, and the right metal deposit.

Thousands of pounds of good metal are lost every year because the correct galvanizing conditions have not been determined. This is all excess zinc which really detracts from the quality of the product.

As an illustration, a "standard galvanizing practice" was set up in one plant covering hundreds of different sizes, kinds and types of articles. All were classified into definite groups, and then individual tests were made to determine the correct galvanizing condition to give the highest quality product. When the correct conditions were found, it was seen that this practice was also the one giving the lowest manufacturing cost.

The startling revelation was the fact that enormous quantities of zinc had been lost by putting on excess metal because the temperature was too high, or the speed too fast, or the submersion time too long.

It is easy for this to happen. For instance, in galvanizing pipe, many pieces may be put into the bath at once but removed only one or two at a time. The first pipe out have a short submersion time, a good coating and a light deposit of metal. The last pipe out have a long submersion time and an extremely heavy zinc deposit which in many cases peels and flakes in service. Each size of pipe has its right bath temperature, right speed of production and right submersion time. When each factor is right, the correct amount of zinc is deposited and the quality is best.

The amount of metal loss is a direct function of how far galvanizing conditions are from the right conditions.

Hidden Metal Losses: An average metal loss of 3 to 5 per cent may be classed as hidden losses. Such a loss is the nonmetallic content of slab zinc, which is usually about 1 per cent. This may go up to 2 per cent, while some metal has as low as only a half per cent of dirt, scurf and oxide in it. Whatever the amount is, an average value should

When detailed tests to determine the galvanizing conditions best suited for each article to be handled were followed up by adoption of these conditions—the astounding result was that not only did correct galvanizing conditions produce the highest quality product but that this was done at lowest manufacturing cost. Hence every galvanizer could well afford to follow this practice

tain around 3.75 per cent iron content.

What To Do: The way to save zinc with this knowledge is to find out immediately the temperature down in the dross, and also to send a dross sample to check up the iron content. If, for example, not enough heat is being applied to the bottom of the pot. If it is over 4 to 4.50 per cent, the bottom of the pot is too hot. It should never be over 875 degrees Fahr. If much below 860 degrees, much good zinc will be lost in the dross.

Poor Dressing Equipment: An enormous metal loss can be had by poor dressing equipment. Here another principle is involved—the

good metal is to use a piece of equipment called a "dross vibrator." A number of these are already in use. The vibrator is attached to the handle or side of the spoon. Then the air valve is opened, causing the spoon to vibrate. The zinc-iron alloy crystals act like straw and stay in the spoon, but the molten zinc acts like water and is shaken out quickly. An average of about 15 per cent better recovery than with hand methods may be expected.

Galvanizing Practice: Extremely large metal losses can be caused by faulty galvanizing practice. The three vital factors that affect the metal deposited as a zinc coating are bath temperature, production

be found and used in buying metal.

Another hidden loss which may be serious is the use of black weights and galvanized weights in figuring the zinc used for the coating. All iron and steel articles have scale and iron oxide which must be removed by pickling, sand blasting or some other cleaning process. The loss of weight due to the scale removed must be reckoned with—otherwise a metal loss will show up when making the metal balance sheet. Scale losses may range from 5 to 7 per cent on heavy work and from 1.50 to 3 per cent on light work. Therefore, be sure to use the weight of the cleaned article in figuring the actual amount of zinc deposited as coating.

Still another hidden loss is the weighing loss. All scales should be checked from time to time, and one man should always have charge of weighing all raw materials. Metal thrown about on the floor and stripping losses should also be taken into account. In some instances, these metal losses are quite high. Finally in making up the metal balance sheet, the correct analyses of the by-products may become an important factor.

Attention is again called to the iron content of the dross in its relation to bath temperatures. The average galvanizer's dross should not at any time go much over 4 per cent in iron. If a chemical analysis shows, 6, 8, 10 or 12 per cent iron content, then something should be done instantly—the dross should be sent to another chemist for analysis, and the temperature in the pot should be checked at once. If the first chemical analysis proves correct, then the pot is being destroyed rapidly from overheating. If the first chemical analysis was wrong, then the check analysis by another chemist will reveal that fact.

Check List: To obtain the highest possible efficiency of zinc consumption, use this following check list.

Metal losses in the sal-ammoniac skimmings.

Metal losses in the oxide skimmings.

Metal losses due to improper heat application.

Metal losses due to poor dressing equipment.

High metal losses due to freezing it in the dross.

Metal losses due to incorrect galvanizing practice.

Metal losses hidden in materials, weighing, and operating conditions. The theft of metal might also be included in hidden losses.

Flat Head Rivets

(Concluded from Page 75)

the desired position to obtain the desired driving speed of the ram

and die. This driving speed is regulated by lengthening or shortening the connecting rod by means of the turnbuckle RSO 402, thereby causing wider or less opening of the main valve of the riveter, respectively, at the end of the control cylinder piston strike.

As soon as the required pressure for driving the rivet properly is reached in the riveter cylinder, the control valve M 551 causes the plunger RSO 395 of the small cylinder on the operating valve to fly out and cause the trigger or lever to move quickly to the left.

This then produces a reverse motion of the piston in the control cylinder and automatically reverses the riveter. The action is practically instantaneous and accurately governs the pressure applied to the rivet.

Line C is the air supply line for operation of the control system. Lines B and F supply the air to the control cylinder M 550. Line A supplies air to the stop release cylinder M 893. Line D below words—"Main Cyl. H.P." transmits the pressure in the main riveter cylinder valve M 551. Line E supplies pressure to operate the small operating valve cylinder M 982.

The cut off valve, M 567, prevents pressure reaching the control valve until the main piston of the riveter has moved forward a suf-

ficient distance to insure proper working of the control system. As mentioned, it is used only when the riveter piston leaks air badly. If the riveter main piston is air tight, the line D is connected with the side of the riveter cylinder so the port opening is closed when the riveter piston is in the reverse position but far enough forward to require ample motion of the riveter piston forward before the port is uncovered.

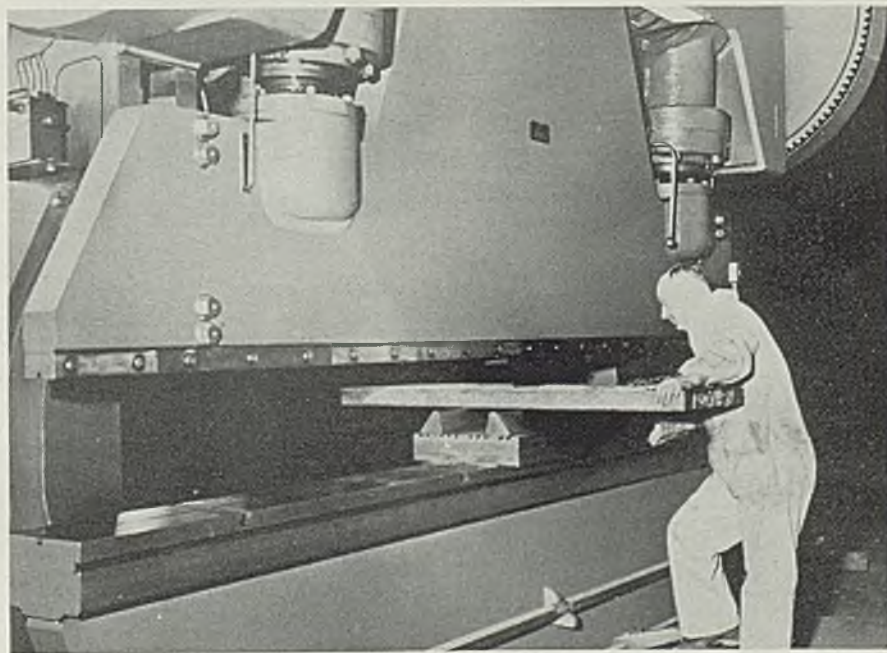
The pressure at which the riveter is automatically reversed is regulated by the adjusting screw M 777.

If the riveter is stationary, it may be desired to dispense with the slower approach speed. If the pin M 700 is pulled out and the catch underneath it thrown in position to hold plunger RSO 184 out of contact with the stop M 1015, this will be done.

The riveter can be reversed manually by pushing the trigger or lever to the left.

Closing valve M 554 prevents the automatic control from operating and requires manual operation by moving the trigger or the lever to the right or left. This can be done when it is desired to clamp a piece of work in the riveter for reaming and for other similar operations. Of course, this system is patented.

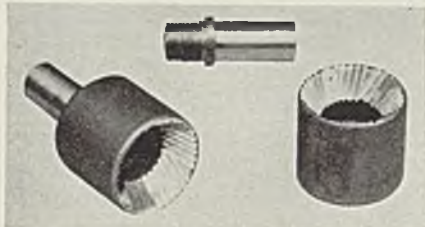
Straightening Armor Plate Quickly



■ An important job in recent months is the straightening of armor plate. Heat treating often causes armor plate to become warped and it then must be returned to shape. Bending presses have been found to be a fast economical method for performing this work. Illustrated above is a Cleveland Crane & Engineering Co. press straightening armor plate that is 2½ inches thick with a tensile strength of 170,000 pounds per square inch. Presses of this type are capable of running continuously 24 hours a day, exerting the tremendous power required for the straightening job

Cutting Tool

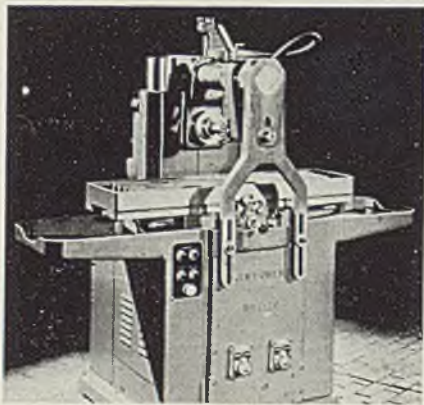
■ Severance Tool Mfg. Co., Saginaw, Mich., announces a new cutting tool for deburring ends of rods and tubing. It has a standard mouth angle, which produces a chamfer of



either 30 or 45 degrees as required. The cutting action of this tool is due to the tooth design which produces a shearing cut that forces the chips out or from the tool, preventing loading. The tool is available in various sizes. Each size cutter covers rod diameters within the range of its mouth angle, that is, diameters between the recess or "hole" diameter and the mouth or "rod" diameter.

Milling Unit

■ Kent-Owens Machine Co., Toledo, O., announces a new No. 2-20 milling machine featuring a hydraulic feed to the table. It has a 12 x 42-inch table having 20-inch travel in a fully automatic cycle. The table can be fed or rapid traversed in either direction, automatically shifted from rapid traverse to feed in either direction, and automatically reversed at both ends of the stroke. An unusual feature permits independent adjustment of the feed rate for opposite directions of table travel. This makes possible doing one operation at one end of the table and an entirely different operation at the other end. Each direction of the table travel has a separate feed rate control dial, adjusted independently of

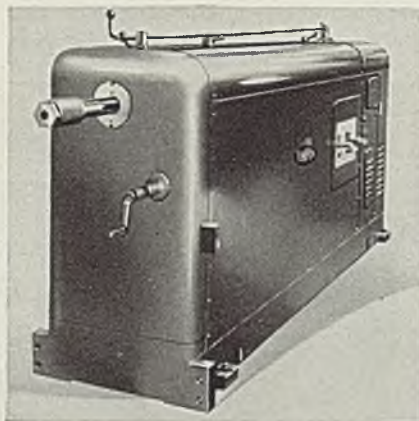


the other. Any one of three spindle speed ranges can be furnished on this unit. A medium range of 64 to 860 revolutions per minute or a high range of 96 to 1284 revolutions per minute can be provided. Wide face, quiet running pick-off

gears are spline mounted. These gears are enclosed under a light weight aluminum cover and run in a bath of oil. The head is mounted on two cylindrical ground steel posts with the spindle midway between them. The spindle is driven by a motor mounted at the rear of the machine and the hydraulic pump by a separate motor enclosed in the base. Both motors are standard foot-mounted ball bearing types.

Honing Machine

■ Enterprise Machine Parts Corp., 2731 Jerome avenue, Detroit, announces a new Empco honing machine which can accommodate work



demanding a stroke up to 57 inches. It takes any type of work in any sizes from 2 to 12 inches in diameter and produces perfectly round, straight, and mirror-finish holes, with tapers and out-of-round dress corrected. Its horizontal position permits a more efficient action of the coolant. The overall height of the machine is 54 inches and the length, 110 inches. The spindle height is 40 inches above the floor level.

Squaring Shear

■ Niagara Machine & Tool Works, 637 Northland avenue, Buffalo, announces a new No. KL-18 power squaring shear having an 18-foot cutting length and capacity of 3/16-inch. It features accurate flat cutting and increased production. The shear is equipped with a quick set-

Industrial

ting, self-measuring ball-bearing, parallel back gage adjustable to increments of 1/128-inch. All drive gears are mounted on antifriction bearings and are enclosed in an oil-tight case. The shear is controlled by means of a 14-point clutch, op-



erating in a bath of oil. The illustration shows this shear equipped with fluorescent lights which perform the dual function of illuminating the working surface of the bed and throwing a shadow line at the cutting line for convenience in shearing to a straight edge. Toggle operated, independent spring pressure foot hold-down provides a smooth and firm grip on sheets of varying lengths. Adjustable truss rod insures a straightness of the knife throughout its length. Low slope of crosshead contributes to flat cutting of narrow strips.

Switching Locomotive

■ H. K. Porter Co. Inc., 4975 Harrison street, Pittsburgh, has introduced a new steam locomotive for steel mill, switching and general plant use. Designed for use on 30-inch track up to standard gage, it is 7 feet 4 inches wide, 10 feet 6 inches



high and 22 feet 10 inches long from bumper to bumper. Four 42-inch diameter drive wheels provide a tractive force of 26,000 pounds. Despite its large tractive force, the

Equipment

locomotive is designed so that it can take a curve of 50 foot radius. It is of the saddle tank type, carrying a boiler 56 inches in diameter, suitable for a working pressure of 180 pounds per square inch. Bituminous coal is used for fuel. Frames are of heavy slab steel. Slab steel bumpers are provided at front and rear with the boiler well secured to the frames, allowing freedom for expansion and contraction. The cab is constructed of sheet steel, with clear wire glass windows at rear, and side windows with steel sash, vertically telescoped. Total weight of the locomotive is 118,000 pounds.

Pipe Cutter

■ Ridge Tool Co., Elyria, O., announces a new No. 42 heavy-duty pipe cutter for use when working in close quarters. Its four cutting wheels provide better balance and facilitates handling under all condi-



tions, cut more evenly and save time in cutting iron, steel or brass pipe. The frame of the unit is of malleable alloy and the capacity of the cutter enables handling ½ to 2-inch pipe.

Particle Remover

■ Dings Magnetic Separator Co., 663 Smith street, Milwaukee, has placed on the market a new De-Ironer for removing particles of magnetic materials from circulating lubricating oil. Basically, it consists of a cast bronze bowl containing a set of grids or screens which are highly magnetized by a powerful electro-magnetic coil. Usually on the larger models, over 9300 lineal feet of magnetized grid edges will go into a c t i o n when the current is thrown into the coil. The unit will remove particles as small as micron size. It

is built of corrosion resistant parts—bronze bowl, chromium plated, stainless steel grids. To clean the



unit the grids may be removed. The capacity of various models on oil range from 5500 to 14,000 gallons per hour.

Convertible Shovel

■ Link-Belt Speeder Corp., 301 West Pershing road, Chicago, announces a new model 75 light-weight ¾-yard convertible shovel-dragline-crane for heavy-duty handling. Of all-welded steel construction, its power is supplied by either a heavy-duty gasoline or diesel engine. Alloy steel, machine-cut spur gears drive the reverse and drum

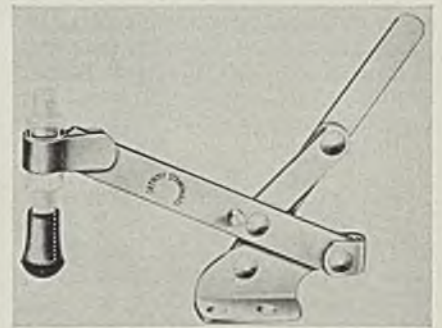


shafts, the latter turning in heavy bronze bearings. The incorporation of external band clutches enable the operator to "feel" the load at all times, and a large-diameter turntable and long, wide crawlers

give the model extra stability on slopes and in heavy digging. A roller path machined on a bevel permits the use of large wide-faced conical rollers that revolve without slippage. A 3-piece traction shaft driven by fully enclosed alloy steel bevel gears transmits power to the crawlers by means of heavy roller chains. The crawler shoes are abrasion-resisting, non-clogging, lug driven with close pin centers to insure smooth action. Added stability results from using double-faced track rollers, increasing the effective crawler width. Track adjustment is provided at both ends to maintain alignment and tension. Controls operated from within the cab permit steering in both directions. A positive traction lock also controlled from the cab and engaging in three positions, prevents movement of the crawlers while working.

Toggle Clamp

■ Detroit Stamping Co., 359 Midland avenue, Detroit, has placed on the market a new De-Sta-Co. No. 200 light weight toggle clamp suited for production work in the aircraft industry. Its overall measurements are 6 x 6 x 1 3/16 inches giving it a clamping ratio of about 33:1. It can be used for holding parts during

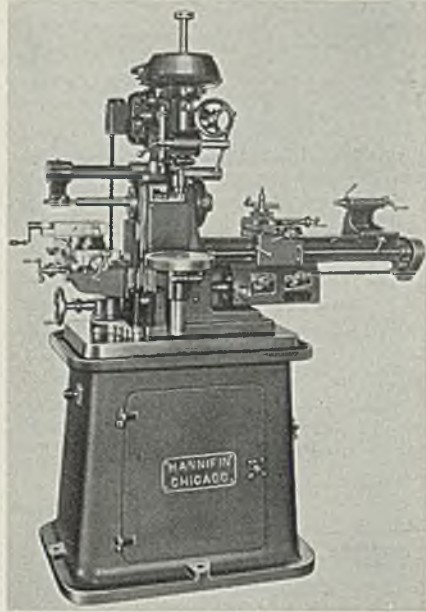


welding, drilling, machining, assembly and other operations. The clamp is of steel and weighs only 9¼ pounds. To prevent marring or denting of surfaces being clamped, a special rubber bolt head to fit a ¾-inch bolt is being furnished with each clamp.

Tool Room Machine

■ Hannifin Mfg. Co., 621 South Kolmar avenue, Chicago, announces a new No. 10 tool room machine combined with a thread cutting lathe. Its semisteel lathe bed is of special rectangular section, mounted on a heavy base. Its compound slide has a power longitudinal feed, with a quick change gear box giving 45 thread pitches from 4 to 120 and 63 feed changes from 0.250 to 0.0021. An interlock between the lead screw clamp nut and the compound slide lock prevents engaging both at the

same time. The compound slide has rapid adjustment clamping features, and ground adjustable take-up gibs. The tool post rest is graduated, al-



lowing settings 60 degrees either side of center. Feed-screw handles have adjustable micrometer dials of large diameter. The lathe is driven by a reversible 1-horsepower, 1725 revolutions per minute motor, giving 12 spindle speeds, 85 to 1250 revolutions per minute. The spindle is mounted in preloaded ball bearings, and formed to take adapters having B & S No. 10 taper shank. The lathe spindle has a key-drive nose for positive driving of attachments.

Steel Desks

■ Globe-Wernicke Co., Carthage, avenue, Cincinnati, announces a new double pedestal steel GlobeArt desk which combines smart appearance with utility and efficiency. Its top is rounded at edges and corners. In addition to standard green and walnut or mahogany grained finishes with bronze trim, the desk is avail-



able in a shade of seal gray with white metal trim. It also may be had in two models. Model S760 is the regular desk equipped with a large storage or filing drawer, one box drawer at the left and three box drawers at the right side. Model S776 is the drop board typewriter

type with the same filing and drawer space. The tops of both are surfaced with heavy battleship linoleum.

Heavy-Duty Sanders

■ Stanley Electric Tool division, New Britain, Conn., has placed on the market powerful heavy-duty sanders for use on difficult production and repair jobs. Their mechanical refinements—for example, strong aluminum alloy housings, dust and dirt free seal type ball bearings on armature and spindle, heavy duty nickel steel precision spiral gears, totally enclosed double pole switch and ventilated Universal motor make for trouble free service. The units can be used for sanding, grinding, buffing and surfacing of wood, metal and concrete. They are available complete with bevel type flexible pad, 6 abrasive disks (three for metal and three for wood), wrenches and heavy rubber-covered 3-wire cable. Additional accessories such as felt rubbing pad, lambs wool polishing bonnet and

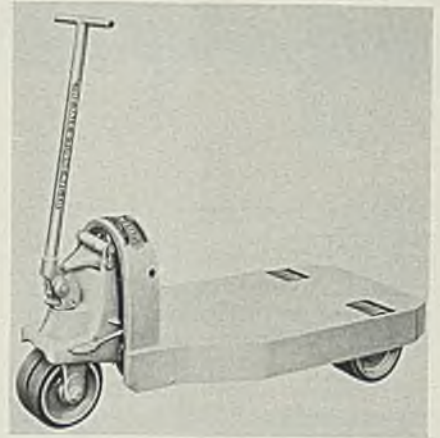


pad, and wire torque brush may be furnished. Sander No. 72 with a 7-inch diameter disk has a speed of 4200 revolutions per minute, while sander No. 92 has a 9-inch diameter disk and a speed of 330 revolutions per minute. Both operate on either direct or alternating current.

Hand Lift Truck

■ Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia, has introduced a balanced hydraulic hand lift truck, the Load King, featuring easier lift, easier steer, greater safety to operator, lower maintenance and controlled lowering of loads. It is built for continuous heavy-duty service, and is available in capacities of 3500, 5000, 6000 and 8000 pounds. The hydraulic lifting unit of the truck is self-contained and totally enclosed. The pump unit is equipped with automotive type piston and piston rings which guarantee maximum pressure at all times. The large diameter lift ram is solid steel. Operating in a cylinder equipped with Chevron leather seals encased in bronze bushings, it assures maintenance of oil pressure to support loads in elevated position. The hydraulic unit has a 5-pint oil reservoir or the equivalent of 5 years supply. Full protection is embodied for the pump unit. The

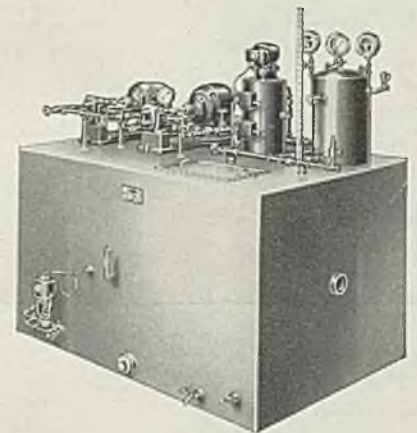
1-piece frame serves the double purpose of elevating platform and frame. All parts consisting of frame, rear wheel assembly and front head assembly, are designed



for safety. Wheels on standard models are smooth machine-faced steel, equipped with ball bearings and sealed to exclude foreign matter. A full 200-degree lifting and steering arc increases maneuverability of the truck.

Lubricating Units

■ S. F. Bowser & Co. Inc., Fort Wayne, Ind., announce a series of new lubricating units for use in power plants as well as in the manufacturing division of many industrial plants. Designed to store, pump, filter and circulate the oil to the machine, these units are made in numerous sizes and in several types to meet various conditions. Entirely self-contained, some



of these models embody alarms to indicate trouble. Because these lubricators are self-contained, all that is necessary to place one in operation is to connect up the pipe line and wiring. Most auxiliary equipment such as the receiving tank, temperature regulator, thermometer, etc., are standard. The motor is not included as standard equipment.

< < HELPFUL LITERATURE > >

1. Tap Grinder

Henry P. Boggis & Co.—6-page illustrated bulletin, "Hybco Tap Grinders," sets forth features of line of tap grinders for sharpening chamfer, flutes and special points. Tables give dimensional data and specifications of both bench and floor models. Closeup views show machines in action.

2. Industrial Products

Johns-Manville—52-page illustrated catalog No. GI-6A contains information and recommendations on high and low temperature insulations. Data are included on refractory products and castables, insulated roofs, siding, friction materials, conduit, pressure pipe, packings, gaskets, flooring plank, asphalt tile flooring and movable partitions.

3. Rolling Doors

Kinnear Manufacturing Co.—40-page illustrated bulletin No. 28 gives complete information on steel rolling doors, labeled fire doors and shutters, metal rolling grilles, wood and steel roll top and folding doors, rolling wood partitions, and door operating equipment.

4. Hot Metal Cars

Koppers Co.—8-page illustrated bulletin describes self-dumping type pugh ladle hot metal transfer cars. Units have 125-ton capacity and are designed to reduce weight, minimize impact stresses, and hold clearance requirements to minimum.

5. Conveyor Screw Blades

Lee Spring Co.—6-page illustrated folder, "Keep It Moving," outlines six features of "Lee" conveyor screw blade which consists of band of steel wound edgewise and pitched to form helix. It is necessary only to slide shaft through center and weld to form helical screw conveyor.

6. Steel Stock List

Levinson Steel Co.—24-page "1940-41 Stock List" gives dimensions, weight and extras for structural steel beams, channels, sheets, plates, bars, and other stock items. Cutting extras are given. Tables give circumference and area of steel circles.

7. Oil Circuit Breakers

Roller-Smith Co.—8-page illustrated catalog No. 3650 sets forth details of outdoor oil circuit breakers of multiple single pole construction for general distribution service. Features, construction, methods of tripping, transformers, and automatic reclosing equipment are discussed. Photographs and drawings show dimensions and operation of equipment.

8. Bar & Tube Machine

Medart Co.—4-page illustrated bulletin is descriptive of model RFG bar and tube turning and finishing machines which are designed for high production, centerless bar turning on bars in any length exceeding 10 feet. Standard range of units is from 1 to 6 inches in diameter. Larger sizes can be set up for as required.

9. Electric Hoists

Shepard Niles Crane & Hoist Corp.—48-page illustrated catalog No. 127 contains information on adaptability, application, and mechanical details of electric hoists. It also lists speeds, lifts, dimensions, and operating data. Tables and drawings give complete dimensional data.

10. Swaging Machines

Etna Machine Co.—6-page illustrated broadside describes series 30 and 70 swaging machines. First size, series 30, has maximum capacity of 3/4-inch diameter and a die length of 1 inch; second size, series 70, has maximum capacity of 1/2 inch and a die length of 2 inches. Specifications and dimensions for both machines are given in tabular form.

11. Acid Solution Heaters

Fansteel Metallurgical Corp.—18-page illustrated bulletin Form No. Ta-4002 explains features and advantages of heaters for acid tanks, kettles, and reaction vessels made of tantalum. Candle, "U," and coil type heaters and heat exchangers are discussed. Tables give corrosion resistance of tantalum, dimensions of standard bayonet and candle heaters, and heating capacities.

12. Melting Equipment

Whiting Corp.—illustrated folder describes construction and lists features of Whiting cupolas. Photographs show air furnaces, cradle furnaces, side-blow converters and duplexing equipment.

13. Cranes

Euclid Crane & Hoist Co.—20-page illustrated catalog on "Euclid Cranes" explains features and applications of electric cranes which are built in sizes from 1/2 to 100 tons capacity, and for spans up to 100 feet.

14. Planers

Liberty Planer & Manufacturing Co.—12-page illustrated catalog No. 152 describes open side, double housing, and convertible planers. Complete specifications of all sizes are given. Features are outlined and explained pictorially.

15. Water Conditioning

Cochrane Corp.—48-page illustrated catalog No. 3000 on "Hot Process Water Conditioning" discusses removal of hardness, silica and other scale forming material from boiler feed and industrial process waters. Feed water chemistry, heat balances, and engineering data are included.

16. Deep Hole Driller

Pratt & Whitney division, Niles-Bement-Pond Co.—4-page illustrated bulletin No. 452 sets forth features and specifications on No. 1 1/2 deep hole driller, built to handle wide range of work requiring long true holes up to 2-inches in diameter. This includes gun barrels, connecting rods, hollow spindles, bridge pins, boring bars, printing press rolls and crank and cam shafts.

17. Electric Motors

Allis-Chalmers Manufacturing Co.—28-page illustrated bulletin No. B-6107 covers all types of motors which are suitable for driving auxiliary equipment in power plant application. Installations of units, ranging upward of one horsepower are described.

18. Compressors

Worthington Pump & Machinery Corp.—8-page illustrated bulletin No. L-611-B12B is devoted to steam and motor driven single horizontal three stage compressors. Closeup and cutaway views show details of construction and operation. Text gives complete specifications of all models.

19. Diesel Engines

Caterpillar Tractor Co.—32-page illustrated catalog No. 6425 is condensed catalog of "Caterpillar" diesel engines, tractors, gas engines, road machinery and generating sets. Brief specifications are given for each of over 50 products which are shown.

20. Nickel Alloy

International Nickel Co.—16-page illustrated bulletin No. T-7 gives engineering properties of "Inconel." Such properties as composition, corrosion resistance, working, physical and mechanical characteristics are included. Typical uses and mill products are described.

21. Photoelectric Relay

General Electric Co.—4-page illustrated bulletin No. GEA-3533 presents complete information on design and application of photoelectric relay for counting, diverting, controlling, signalling, limiting and protecting. Relay, light source and transformer combinations, including tubes, list for as low as \$28.15.

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22. Blowers

Roots-Connersville Blower Corp.—6-page illustrated bulletin No. R-5341 is devoted to discussion of positive displacement blowers for raw water ice plant service. Several installation views are included, together with photographs showing standard drive arrangements.

23. Insulating Material

Owens-Corning Fiberglas Corp.—8-page illustrated folder No. G4A describes "Fiberglas" in sheets and slabs of various thickness designed for installation against flat or curved metal surfaces. Recommended applications, sizes available and advantages are listed. Action photographs show material being applied.

24. Welding Electrodes

Page Steel & Wire division, American Chain & Cable Co.—14-page illustrated bulletin No. DH-984 points out features of electrode of shielded-arc type, suitable for all welding positions with alternating or direct current. Tables and line drawings give specific instructions for use of electrodes.

25. Vibrating Conveyor

Ajax Flexible Coupling Co.—8-page illustrated bulletin No. 31 shows typical applications of Lo-Veyor self-contained, vibrating type, bulk material conveyors for overhead, floor, and sub-floor installations. Open and dustproof designs are described.

26. Milling Machine

Midway Machine Co.—8-page illustrated bulletin outlines features and gives specifications on No. 2½ "Millmaster" vertical milling machines for metal working, wood working and plastics fabrication operations. Unit is designed for boring, milling routing, drilling, grinding and die sinking.

27. Phosphorus-Iron Alloys

Monsanto Chemical Co.—20-page illustrated technical report No. 4 gives results of experimental research investigation upon influence of phosphorus in steels in elevated temperature service and in chromium-molybdenum steels. Photomicrographs and charts supplement text.

28. Blueprint Machine

C. F. Pease Co.—4-page illustrated folder lists features of Model 2216 combination blueprinting machine and washer and dryer. Complete specifications and data on operating advantages are given.

29. Quill Bearings

Bantam Bearings Corp.—4-page illustrated bulletin No. 103 gives complete specifications and list prices on quill roller bearings which are available with or without inner races. Features of units are described and typical applications shown with sectional drawings.

HELPFUL LITERATURE

(Continued)

30. Stainless Steel

Allegheny Ludlum Steel Corp.—28-page bulletin No. B-109 is entitled, "Fabrication of Allegheny Stainless Steels." Welding, drawing and blanking, machining, spinning, upsetting and forging, riveting, shearing, soldering and brazing, heat treatment, grinding and polishing are some of subjects covered.

31. Calendar

Brown Instrument Co.—Illustrated 1941 calendar No. G-42 covers varied problems encountered in modern industrial processes in humorous vein by series of cartoons. Charts on steam leakage, psychrometric data, pipe data, and similar engineering information are included.

32. Bronze Bearing Stock

Boston Gear Works, Inc.—32-page illustrated catalog No. O-3 contains information on 443 plain cylindrical, 49 flanged and 23 thrust type "Oilite" bronze bearings, as well as listing oil cushion bronze in cored bar, solid bar and plain stock form for machining to odd sizes and shapes.

33. Air Heaters

Despatch Oven Co.—8-page illustrated bulletin No. 74 shows design features and applications of gas and oil fired indirect air heaters for use in conjunction with ovens, dryers and space heating in all types of industrial and process plants.

34. Contour Sawing

Continental Machines, Inc.—64-page spiral-bound illustrated catalog on "Do-all" contour machines includes description and specifications on available types of machine, precision saws, file bands and attachments, as well as showing applications of this type of machining.

35. Fluorescent Lighting

Westinghouse Electric & Manufacturing Co.—15-page illustrated manual, "How to Design Fluorescent Lighting," is replete with mounting and structural details, room proportions, reflection factors, suggested equipment, cost analyses, and other data for those interested in applications of fluorescent lighting.

36. Metal Cutting Saws

Peerless Machine Co.—8-page illustrated bulletin No. 52 describes line of Peerless power saws for metal cutting. It lists advantages, detailed specifications and recommendations for correct types of hacksaw blades for various materials.

37. Printing Scale

Fairbanks, Morse & Co.—Three illustrated 4-page bulletins on "Printomatic Weighers" show typical applications of these scales in steel plants and warehouses. Dial type scales record each weight on ticket which is then ejected from side of scale.

38. Conveyor Belt

B. F. Goodrich Co.—10-page illustrated bulletin on "Cored Conveyor Belt" outlines construction and features of this belting for all types of conveyor applications. Belting is capable of withstanding high impact, cutting, gouging, and abrasion, as well as being resistant to acids.

39. Grouting Material

Fort Pitt Chemical Co.—2-page data sheet on "Groutex" gives specifications, properties and advantages of this grouting material. It grouts without shrinking, is oil and water proof, has high compression strength and hardens quickly.

40. Truck Storage Batteries

Edison Storage Battery division, Thomas A. Edison, Inc.—24-page illustrated bulletin, "Modern Material Handling," outlines advantages of steel-alkaline batteries in all types of battery industrial trucks and tractors. Typical applications are shown and complete specifications are given on batteries.

41. Cut-on Wheels

Norton Co.—10-page illustrated folder covers use of "Norton" cut-off wheels on "Delta" equipment. It contains suggestions for best results in use of abrasive cut-off saws and wheels, and recommendations for types of wheels to use on various materials and equipment.

42. Steel Floor Plate

Alan Wood Steel Co.—16-page illustrated bulletin, "Rolled Steel Floor Plate," furnishes complete data pertaining to five available patterns which are designed to meet every possible flooring problem in industrial and transportation fields.

43. Bonding Mortars

Harbison-Walker Refractories Co.—16-page illustrated bulletin on "High Temperature Bonding Mortars" gives properties of three types of materials for use with various types of brick. Specific applications for each are recommended.

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Alloying and Coating

Metals Are Scarcer

Chromium, due to substitution for nickel, is tighter. Steel sales exceed February's. Inland announces restricted sales policy.

■ STEEL sales of both makers and warehouse distributors are running ahead of February despite the fact that that short month was an all-time high for volume. The situation becomes outwardly calmer as consumers become reconciled to scarcity and belated deliveries, while many civilian projects are abandoned until more favorable times. Several groups planning to set up new companies, such as warehouses or metal-working concerns, have given up plans because of policy of steelmakers to take on no new customers.

Scarcity of nonferrous metals for alloying and coating continues one of the main problems. Chromium, which met with increasing demand when nickel became tight, has itself tightened considerably. Low-carbon ferromanganese is tense and in the 80 per cent product the steel industry merely holds its own. Ferrosilicon is tightening and vanadium is more critical because of a strike continuance of a producing plant. Limitation in available power prevents increased production of some ferroalloys. In galvanized products there is the tendency to use thinner coatings, but improved processes tend to maintain quality of finished goods.

Though base prices of steel have been unchanged these many months consumers are actually paying more. A plate maker estimates \$2 per ton over-all higher prices because of gradual stiffening of extras on widths, lengths and quantities. Often the user pays full prices for rejects or off-gage materials.

The charging of extras among producers is less uniform than normal. Many extras do not go into effect actually until long after they are imposed because of the tendency to sell far into the future. Just coming to light now, for instance, is a change on cold-rolled sheets, heavier than 11 gage, made Nov. 28, 1940, by a leading company, providing for a premium of \$1 per 100 pounds where previously a discount of 15 cents prevailed.

Certain consumers object to recent efforts at Washington to get scrap prices reduced on the ground that the law of diminishing returns will lessen the supply. Already a number of scrap collectors have gone into more lucrative fields such as defense work where pay is more regular and certain.

More steelmakers have been taking salesmen off

the road for fear of overselling, though the industry is still divided on the wisdom of the policy, particularly since salesmen have the double role of selling and maintaining good will.

A pronounced decline in sales of fabricated structurals is noted. According to STEEL's compilations, sales involving 100 tons or more per project in March are running only 15,000 tons weekly as against 28,000 tons in February and over 50,000 tons in January, this perhaps proving predictions that after early phases of defense structurals would subside. Such falling off is welcome as it will allow steel's diversion to other urgent needs.

Inland Steel Co., Chicago, has issued a statement of sales policy. The company will henceforth accept only such orders as can be included in 1941 schedules and these "only in relation to previous sales." No orders for 1942 delivery will be accepted until books are opened for first quarter except for certain defense projects. Their weekly rolling program will be discontinued until further notice. (See page 33).

Despite passage of the lease-lend bill British purchasing of steel here has been light. In fact, there has been no really large scale purchasing since last fall.

Automobile production for the week ended March 22 was scheduled for 124,805 units, a drop of 6815 for the week, comparing with 103,395 units the same week last year.

Steel ingot production gained another point last week to 99½ per cent of capacity, the highest percentage in several years and from a tonnage standpoint an all-time top. Operations increased in the following districts: St. Louis by 6 points to 99, Cincinnati by 4½ points to 93½, Cleveland by 8 points to 98, Pittsburgh by 1 point to 101½, Chicago by 2½ points to 101½, Buffalo by 2½ points to 93 and New England by 8 points to 100. Detroit dropped 4 points to 89. The following districts were unchanged: Birmingham at 90, Youngstown at 97, eastern Pennsylvania at 96 and Wheeling at 88.

Due to adjustments in STEEL's steelworks scrap composite 4 cents was added, making it \$20.12. Iron and steel and finished steel were unchanged, \$38.29 and \$56.60, respectively.

MARKET IN TABLOID ★

Demand

Increasing.

Prices

Strong.

Production

Up 1 point to 99½.

COMPOSITE MARKET AVERAGES

	Mar. 22	Mar. 15	Mar. 8	One Month Ago Feb., 1941	Three Months Ago Dec., 1940	One Year Ago Mar., 1940	Five Years Ago Mar., 1936
Iron and Steel	\$38.29	\$38.29	\$32.26	\$38.22	\$38.30	\$37.07	\$33.20
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.50	52.32
Steelworks Scrap . . .	20.12	20.08	19.96	19.95	21.37	16.47	14.48

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Mar. 22, 1941	Feb. 1941	Dec. 1940	Mar. 1940	Pig Iron	Mar. 22, 1941	Feb. 1941	Dec. 1940	Mar. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c	Bessemer, del. Pittsburgh	\$25.34	\$25.34	\$24.95	\$24.34
Steel bars, Chicago	2.15	2.15	2.15	2.15	Basic, Valley	23.50	23.50	23.50	22.50
Steel bars, Philadelphia	2.47	2.47	2.47	2.47	Basic, eastern, del. Philadelphia	25.34	25.34	24.84	24.34
Iron bars, Chicago	2.25	2.25	2.25	2.25	No. 2 fdry., del. Pgh., N. & S. Sides	24.69	24.69	23.69	23.69
Shapes, Pittsburgh	2.10	2.10	2.10	2.10	No. 2 foundry, Chicago	24.00	24.00	23.75	23.00
Shapes, Philadelphia	2.215	2.215	2.215	2.215	Southern No. 2, Birmingham	20.38	19.38	19.38	19.38
Shapes, Chicago	2.10	2.10	2.10	2.10	Southern No. 2, del. Cincinnati	24.06	23.56	23.06	23.06
Plates, Pittsburgh	2.10	2.10	2.10	2.10	No. 2X, del. Phila. (differ. av.)	26.215	26.215	25.715	25.215
Plates, Philadelphia	2.15	2.225	2.15	2.15	Malleable, Valley	24.00	24.00	23.60	23.00
Plates, Chicago	2.10	2.10	2.10	2.10	Malleable, Chicago	24.00	24.00	23.75	23.00
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10	Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05	Gray forge, del. Pittsburgh	24.19	24.17	23.35	23.17
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50	Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10					
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05	Scrap				
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50	Heavy melt, steel, Pitts.	\$20.75	\$20.75	\$22.75	\$17.05
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60	Heavy melt, steel, No. 2, E. Pa.	18.75	18.50	19.75	15.90
Tin plate, per base box, Pitts.	\$5.00	\$5.00	\$5.00	\$5.00	Heavy melting steel, Chicago	20.00	19.25	20.70	15.50
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55	Rails for rolling, Chicago	24.25	23.75	25.00	18.25
					Railroad steel specialties, Chicago	23.75	23.55	23.95	18.40
Semifinished Material					Coke				
Sheet bars, Pittsburgh, Chicago	\$34.00	\$34.00	\$34.00	\$34.00	Connellsville, furnace, ovens	\$5.50	\$5.50	\$5.50	\$4.75
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00	Connellsville, foundry, ovens	6.00	6.00	6.00	5.75
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00	Chicago, by-product fdry., del.	11.75	11.75	11.75	11.25
Wire rods No. 5 to 3/8-inch, Pitts.	2.00	2.00	2.00	2.00					

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled	
Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c
Cold Rolled	
Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c
Galvanized No. 24	
Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Terns No. 24 Unassorted Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets			
	No. 10	No. 20	
Pittsburgh	2.75c	3.35c	
Chicago, Gary	2.75c	3.35c	
Granite City, Ill.	2.85c	3.45c	
Youngstown, O.	2.75c	3.35c	
Cleveland	2.75c	3.35c	
Middletown, O.	2.75c	3.35c	
Pacific Coast	3.40c	4.00c	

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.			
Chrome-Nickel			
	No.	No.	No.
Bars	302	303	304
Plates	24.00	26.00	25.00
Sheets	27.00	29.00	29.00
Hot strip	34.00	36.00	36.00
Cold strip	21.50	27.00	23.50
	28.00	33.00	30.00
20% Ni-Cr. Clad			
Plates			18.00*
Sheets			19.00
*Annealed and pickled			
Straight Chromes			
	No.	No.	No.
Bars	410	416	430
Plates	18.50	19.00	19.00
	21.50	22.00	22.00
			25.50

Sheets	26.50	27.00	29.00	32.50
Hot strip	17.00	18.25	17.50	24.00
Cold stp.	22.00	23.50	22.50	32.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.44c
Philadelphia, del.	2.15c-2.30c
Boston, delivered	2.43c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c-2.25c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates	
Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21 1/2 c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box) Pittsburgh, Gary, Chicago	\$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box) Pittsburgh, Gary, Chicago	\$4.30
Granite City, Ill.	4.40

Roofing Ternes			
Pittsburgh base, package 112 sheets 20 x 28 in., coating I.C.			
8-lb.	\$12.00	25-lb.	\$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Bars

Soft Steel	
(Base, 20 tons or over)	
Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel	
(Base, 5 tons or over)	
Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young, Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads	
Standard and cement coated wire nails	\$2.55
(Per Pound)	
Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	59
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

Base, Pitts.-Cleve.-Chicago Birmingham (except spring wire)	
Bright bess., basic wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c
Worcester, Mass., \$2 higher on bright basic and spring wire.	

Cut Nails

Carload, Pittsburgh, keg	\$3.85
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Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c
*Delivered.		

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c	
Detroit, delivered	2.80c	
Alloy	Alloy	
S.A.E. Diff.	S.A.E. Diff.	
2000	0.35 3100	0.70
2100	0.75 3200	1.35
2300	1.70 3300	3.80
2500	2.55 3400	3.20
4100 0.15 to 0.25 Mo.	0.55	
4600 0.20 to 0.30 Mo.	1.50-	
2.00 Ni.	1.20	
5100 0.80-1.10 Cr.	0.45	
5100 Cr, spring flats	0.15	
6100 bars	1.20	
6100 spring flats	0.85	
Cr. N., Van.	1.50	
Carbon Van.	0.85	
9200 spring flats	0.15	
9200 spring rounds, squares	0.40	
Electric furnace up 50 cents.		

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa.	3.50c
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Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less	
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young, Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c
Carbon	Cleve., Pitts.
0.26-0.50	2.80c
0.51-0.75	4.30c
0.76-1.00	6.15c
Over 1.00	8.35c
Worcester, Mass.	\$4 higher.

Commodity Cold-Rolled Strip	
Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c
Lamp stock up 10 cents.	

Rails, Fastenings

(Gross Tons)	
Standard rails, mill	\$40.00
Relay rails, Pittsburgh 20-100 lbs.	\$32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham	\$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills.	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c
Base, light rails 25 to 60 lbs., 20 lbs., up \$2; 16 lbs. up \$4; 12 lbs. up \$8; 8 lbs. up \$10. Base railroad spikes 200 kegs or more; base plates 20 tons.	

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discount for carloads additional 5%, full containers, add 10%.

Carriage and Machine	
1/2 x 6 and smaller	68 off
Do., 5/8 and 3/4 x 6-in. and shorter	66 off
Do., 3/4 to 1 x 6-in. and shorter	64 off
1 1/2 and larger, all lengths	62 off
All diameters, over 6-in. long	62 off
Tire bolts	52.5 off

Stove Bolts	
In packages with nuts separate	
73-10 off; with nuts attached	
73 off; bulk 81 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.	
Step bolts	60 off
Plow bolts	68.5 off

Nuts	
Semifinished hex. U.S.S.	S.A.E.
1/2-inch and less	66 70
3/8-1-inch	63 65
1 1/4-1 1/2-inch	61 62
1 1/2 and larger	60

Hexagon Cap Screws	
Upset 1-in., smaller	68 off
Square Head Set Screws	
Upset, 1-in., smaller	74.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
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Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., B'ham.

Structural	3.40c
1/4-inch and under	65-10 off
Wrought washers, Pitts., Chl., Phila., to jobbers and large nut, bolt mfrs. l.c.l.	\$5.40; c.l. \$5.75 off

Welded Iron, Steel, Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2 1/2 and 1 1/2 less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld Steel		
In.	Blk.	Galv.
1/2	63 1/2	54
3/4	66 1/2	58
1-3	68 1/2	60 1/2

Iron		
1-1 1/4	30	13
1 1/2	34	19
2	38	21 1/2
2 1/2	37 1/2	21

Lap Weld Steel		
2	61	52 1/2
2 1/2-3	64	55 1/2
3 1/2-6	66	57 1/2
7 and 8	65	55 1/2

Iron		
2	30 1/2	15
2 1/2-3 1/2	31 1/2	17 1/2
4	33 1/2	21
4 1/2-8	32 1/2	20
9-12	28 1/2	15

Line Pipe Steel	
1 to 3, butt weld	67 1/2
2, lap weld	60
2 1/2 to 3, lap weld	63
3 1/2 to 6, lap weld	65
7 and 8, lap weld	64

Iron		
1/2 butt weld	25	7
1 and 1 1/4 butt weld	29	13
1 1/2 butt weld	33	15 1/2
2 butt weld	32 1/2	15
1 1/2 lap weld	23 1/2	7
2 lap weld	25 1/2	9
2 1/2 to 3 1/2 lap weld	26 1/2	11 1/2
4 lap weld	28 1/2	15
4 1/2 to 8 lap weld	27 1/2	14
9 to 12 lap weld	23 1/2	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded			
Sizes	Gage	Steel	Charcoal
1 1/2" O.D.	13	\$ 9.72	\$23.71
1 3/4" O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2 1/4" O.D.	13	13.79	21.68
2 1/2" O.D.	12	15.16	
2 3/4" O.D.	12	16.58	26.57
3" O.D.	12	17.54	29.00
3 1/2" O.D.	12	18.35	31.36
3 3/4" O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	

Seamless			
Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	\$ 7.82	\$ 9.01
1 1/4" O.D.	13	9.26	10.67
1 1/2" O.D.	13	10.23	11.79
1 3/4" O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2 1/4" O.D.	13	14.54	16.76

2 1/2" O.D.	12	16.01	18.45
2 3/4" O.D.	12	17.54	20.21
3" O.D.	12	18.59	21.42
3 1/2" O.D.	12	19.50	22.48
3 3/4" O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4 1/2" O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton
6-in. & over, Birm. \$45.00-46.00
4-in., Birmingham 48.00-49.00
4-in., Chicago 56.80-57.80
6-in. & over, Chicago 53.80-54.80
6-in. & over, east fdy. 49.00
Do., 4-in. 52.00
Class A Pipe \$3 over Class B
Std. ftgs., Birm., base \$100.00.

Semifinished Steel

Rerolling Billets, Slabs (Gross Tons)	
Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	\$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets	
Pitts., Chl., Gary, Cleve., Young, Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars	
Pitts., Cleveland, Young, Sparrows Point Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods	
Pitts., Cleveland, Chicago, Birmingham No. 5 to 3/8-inch incl. (per 100 lbs.)	\$2.00
Do., over 3/8 to 1 1/2-in. incl.	2.15
Worcester up \$0.10; Galveston up \$0.25; Pacific Coast up \$0.50.	

Skelp	
Pitts., Chl., Youngstown, Coatesville, Sparrows Pt.	1.90c

Shell Steel	
Pittsburgh, Chicago, base, 1000 tons of one size, open hearth	
3-12-inch	\$52.00
12-18-inch	54.00
18-18-inch and over	56.00

Coke

Price Per Net Ton	
Beehive Ovens	
Connellsville, fur.	\$5.00-5.75
Connellsville, fdry.	5.25-6.00
Connell prem. fdry.	6.00-6.60
New River fdry.	6.50-7.00
Wise county fdry.	5.50-6.50
Wise county fur.	5.00-5.25

By-Product Foundry	
Newark, N. J., del.	11.85-12.30
Chicago, outside del.	11.00
Chicago, delivered	11.75
Terre Haute, del.	11.25
Milwaukee,ovens.	11.75
New England, del.	13.00
St. Louis, del.	11.75
Birmingham,ovens.	7.50
Indianapolis, del.	11.25
Cincinnati, del.	11.00
Cleveland, del.	11.55
Buffalo, del.	11.75
Detroit, del.	11.50
Philadelphia, del.	11.63

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	14.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylo	26.00c
Per lb. f.o.b. Frankford and St. Louis	
Phenol (less than 1000 lbs.)	13.75c
Do. (1000 lbs. or over)	12.75c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls. to jobbers	7.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	\$30.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons-

Basing Points:	No. 2 Fdry.	Malle-able	Basic	Besse-mer
Bethlehem, Pa.	\$25.00	\$25.50	\$24.50	\$26.00
Birmingham, Ala.	20.38	.....	19.38	24.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erle, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	24.50
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00-24.50	24.00-24.50	23.50-24.50	24.50-25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00-24.50	24.00-24.50	23.50-24.50	24.50-25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
Boston from Birmingham†	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.62	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....
Pittsburgh dist.; Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, \$1.07; Oakmont, Verona, \$1.11; Brackenridge, \$1.24.	.....	.....	.....	.....

	No. 2 Fdry.	Malle-able	Basic	Besse-mer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	24.12	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13
†Over 0.70 phos.	.....	.....	.....	.....

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., \$29.50, base; \$30.74 delivered Philadelphia.

Gray Forge	Charcoal	
Valley furnace	\$23.50 Lake Superior fur.	\$27.00
Pitts. dist. fur.	23.50 do., del. Chicago	30.34
	Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent \$29.50; 6.51-7—\$30.00; 7-7.50—\$30.50; 7.51-8—\$31.00; 8-8.50—\$31.50; 8.51-9—\$32.00; 9-9.50—\$32.50; Buffalo, \$1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus \$1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo, is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, \$1 per ton add. Each unit over 3%, add \$1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices	Ladle Brick (Pa., O., W. Va., Mo.)	
Fire Clay Brick	Dry press	\$28.00
Super Quality	Wire cut	26.00
Pa., Mo., Ky.	Magnesite	
First Quality	Domestic dead-burned grains, net ton f.o.b.	
Pa., Ill., Md., Mo., Ky.	Chewelah, Wash., net ton, bulk	22.00
Alabama, Georgia	net ton, bags	26.00
New Jersey	Basic Brick	
Second Quality	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Pa., Ill., Ky., Md., Mo.	Chrome brick	\$50.00
Georgia, Alabama	Chem. bonded chrome	50.00
New Jersey	Magnesite brick	72.00
Ohio	Chem. bonded magnesite	61.00
First quality		
Intermediate		
Second quality		
Malleable Bung Brick	Fluorspar	
All bases	Washed gravel, duty pd., tide, net ton	\$25.00-\$26.00
Silica Brick	Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	20.00-21.00
Pennsylvania	Joliet, E. Chicago	20.00
Joliet, E. Chicago	Do, barge	20.00
Birmingham, Ala.	Birmingham, Ala.	20.00-21.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd.	\$120.00	Do., ton lots	11.75c	Do., spot	145.00	Silicon Metal, 1% iron, contract, carlots, 2 x 1/2-in., lb.	14.50c
Ton lots	130.00	Do., less-ton lots	12.00c	Do., contract, ton lots	145.00	Do., 2% Spot 1/2c higher	13.00c
Less ton lots	133.50	less than 200 lb. lots	12.25c	Do., spot, ton lots	150.00	Silicon Briquets, contract carloads, bulk, freight allowed, ton	\$74.50
Less 200 lb. lots	138.00	67-72% low carbon:		15-18% tl., 3-5% carbon, carlots, contr., net ton	157.50	Ton lots	84.50
Do., carlots del. Pitts.	125.33	Car-loads		Do., spot	160.00	Less-ton lots, lb.	4.00c
Spiegeleisen, 19-21% dom. Palmerton, Pa., spot.	36.00	loads		Do., contract, ton lots	160.00	Less 200 lb. lots, lb.	4.25c
Ferrosilicon, 50%, freight allowed, c.l.	74.50	lots		Do., spot, ton lots	165.00	Spot 1/2-cent higher	
Do., ton lot	87.00	2% carb.	17.50c	Alsifer, contract carlots, f.o.b. Niagara Falls, lb.	7.50c	Manganese Briquets, contract carloads, bulk freight allowed, lb.	5.50c
Do., 75 per cent	135.00	1% carb.	18.50c	Do., ton lots	8.00c	Ton lots	6.00c
Do., ton lots	151.00	0.10% carb.	20.50c	Do., less-ton lots	8.50c	Less-ton lots	6.25c
Spot, \$5 a ton higher.		0.20% carb.	19.50c	Spot 1/2c lb. higher		Spot 1/2c higher	
Silicomanganese, c.l., 3 per cent carbon	113.00	Spot 1/2c higher		Chromium Briquets, contract, freight allowed, lb. carlots, bulk	7.00c	Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton	102.50
2 1/2% carbon	118.00	Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb.	0.95	Do., ton lots	7.50c	Do., ton	108.00
2% carbon, 123.00; 1%, 133.00		Calcium molybdate, lb. molyb. cont., f.o.b. mill	0.80	Do., less-ton lots	7.75c	35-40%, contract, carloads, lb., alloy	14.00c
Contract ton price \$12.50 higher; spot \$5 over contract.		Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots	\$1.23	Do., less 200 lbs.	8.00c	Do., ton lots	15.00c
Ferrotungsten, stand., lb. con. del. cars	1.90-2.00	Do., less-ton lots	1.25	Spot 1/2c lb. higher		Do., less-ton lots	16.00c
Ferrovandium, 35 to 40%, lb., con.	2.70-2.80-2.90	20-25% carbon, 0.10 max., ton lots, lb.	1.35	Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb.	\$2.50	Spot 1/2c higher	
Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, \$3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% \$3 unitage	75.00	Do., less-ton lots	1.40	Do., smaller lots	2.60	Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb.	\$2.60
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots	11.00c	Spot 5c higher		Vanadium Pentoxide, contract, lb. contained	\$1.10	Do., 100-200 lb. lots	2.75
		Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls	\$2.25	Do., spot	1.15	Do., under 100-lb. lots	3.00
		Do., less-ton lots	2.30	Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots	80.00c	Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant	80.00c
		Spot 1s 10c higher		Do., spot	85.00c		
		Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill	0.80	88% chrome, cont. tons	79.00c		
		Ferro-carbon-titanium, 15-18%, tl., 6-8% carb., carlots, contr., net ton	\$142.50	Do., spot	84.00c		

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets			Cold Rolled Strip	Cold Drawn Bars		
							Hot Rolled	Cold Rolled	Galv. No. 24		Carbon	S.A.E. 2300	S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.22	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	3.90	4.00	4.00	3.95	3.95	5.55	3.65	....	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.12	4.87	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.54	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	3.85	3.85	5.50	4.20	....	5.25	....	6.60	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.25	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	4.65	6.45	4.15	4.15	6.40	4.30	6.50	5.25	....	6.60	10.55	9.80
San Francisco	3.75	4.25	6.00	3.75	3.75	5.60	3.75	6.40	5.40	....	6.80	10.65	9.80

—S.A.E. Hot-rolled Bars (Unannealed)—

	S.A.E. Hot-rolled Bars (Unannealed)				
	1035-1050 Series	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	5.25	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis. Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at \$4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH	
	Gross Tons	f.o.b. U.K. Ports
	£	s d
Merchant bars, 3-inch and over	\$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.79c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 21 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	\$ 6.29	1 11 4

British ferromanganese \$120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

	£	s	d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	\$25.79	6	8 0(a)
Basic pig iron	24.28	6	0 6(a)
Furnace coke, f.o.t. ovens	7.15	1	15 6
Billets, basic soft, 100-ton lots and over	49.37	12	5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12 0††
Shapes	2.77c	15	8 0††
Ship plates	2.91c	16	3 0††
Boiler plates	3.06c	17	0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15 0
Bands and strips, hot-rolled	3.30c	18	7 0††

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate of 15s on certain conditions.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	18.00
Bos. dock No. 1 exp.	17.00
New Eng. del. No. 1	18.00-18.50
Buffalo, No. 1	21.00-21.50
Buffalo, No. 2	19.00-19.50
Chicago, No. 1	20.00
Chicago, auto, no alloy	19.00
Cincinnati, dealers.	18.25-18.75
Cleveland, No. 1	20.00-20.50
Cleveland, No. 2	19.00-19.50
Detroit, No. 1	†17.00-17.50
Detroit, No. 2	†16.00-16.50
Eastern Pa., No. 1	20.00
Eastern Pa., No. 2	18.50-19.00
Federal, Ill., No. 2	16.50-17.00
Granite City, R. R. No. 1	17.50-18.00
Granite City, No. 2	16.50-17.00
Los Ang., No. 1 net	14.50-15.00
Los Ang., No. 2 net	13.50-14.00
N. Y. dock No. 1 exp.	†16.50
Pitts., No. 1 (R. R.)	21.00-21.50
Pittsburgh, No. 1	20.50-21.00
Pittsburgh, No. 2	19.50-20.00
St. Louis, No. 1	†17.25-18.25
St. Louis, No. 2	16.50-17.00
San Fran., No. 1 net	15.00-15.50
San Fran., No. 2 net	14.00-14.50
Seattle, No. 1	15.00
Toronto, dlrs., No. 1	12.25-12.50
Valleys, No. 1	21.00-21.50

COMPRESSED SHEETS

Buffalo	19.00-19.50
Chicago, factory	19.00-19.50
Chicago, dealers	18.00-18.50
Cincinnati, dealers.	17.00-17.50
Cleveland	20.00-20.50
Detroit	†17.50-18.00
E. Pa., new mat.	20.00
E. Pa., old mat.	17.50-18.00
Los Angeles, net.	12.50-13.00
Pittsburgh	20.50-21.00
St. Louis	15.00-15.50
San Francisco, net.	13.00-13.50
Valleys	20.50-21.00

BUNDLED SHEETS

Buffalo, No. 1	19.00-19.50
Buffalo, No. 2	17.50-18.00
Cleveland	15.00-15.50
Pittsburgh	19.50-20.00
St. Louis	13.00-13.50
Toronto, dealers	10.00-10.50

SHEET CLIPPINGS, LOOSE

Chicago	15.50-16.00
Cincinnati, dealers.	12.50-13.00
Detroit	†13.50-14.00
St. Louis	12.00-12.50
Toronto, dealers.	9.00

BUSHING

Birmingham, No. 1.	16.00
Buffalo, No. 1	19.00-19.50
Chicago, No. 1	18.50-19.00
Cincin., No. 1 deal.	14.25-14.75
Cincin., No. 2 deal.	7.75- 8.25
Cleveland, No. 2	14.00-14.50
Detroit, No. 1 new.	†16.50-17.00
Valleys, new, No. 1	20.50-21.00
Toronto, dealers	7.00- 7.50

MACHINE TURNINGS (Long)

Birmingham	9.50
Buffalo	14.00-14.50

Chicago	14.00-14.50
Cincinnati, dealers.	10.00-10.50
Cleveland, no alloy.	13.50-14.00
Detroit	†11.00-11.50
Eastern Pa.	15.50-16.00
Los Angeles	4.00- 5.00
New York	†10.50-11.00
Pittsburgh	16.00-16.50
St. Louis	11.00-11.50
San Francisco	5.00
Toronto, dealers.	†8.75- 9.00
Valleys	15.50-16.00

SHOVELING TURNINGS

Buffalo	16.00-16.50
Cleveland	14.50-15.00
Chicago	15.50-16.00
Chicago, spel, anal.	15.50-16.00
Detroit	†12.50-13.00
Pitts., alloy-free.	17.00-17.50

BORINGS AND TURNINGS

For Blast Furnace Use	
Boston district	†8.50- 9.50
Buffalo	14.50-15.00
Cincinnati, dealers.	9.25- 9.75
Cleveland	16.00-16.50
Eastern Pa.	14.50
Detroit	†12.50-13.00
New York	†10.50-11.00
Pittsburgh	17.00-17.50
Toronto, dealers.	†8.75- 9.00

AXLE TURNINGS

Buffalo	17.00-17.50
Boston district	†12.50-13.00
Chicago, elec. fur.	20.00-20.50
East. Pa. elec. fur.	19.50-20.00
St. Louis	14.50-15.00
Toronto	†7.75- 8.00

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem.	†10.75-11.25
Buffalo	14.50-15.00
Chicago	15.50-16.00
Cincinnati, dealers.	9.25- 9.75
Cleveland	16.00-16.50
Detroit	†12.50-13.00
E. Pa., chemical.	17.50-18.00
New York	†11.50-12.00
St. Louis	10.75-11.25
Toronto, dealers.	†8.75- 9.00

RAILROAD SPECIALTIES

Chicago	23.50-24.00
Chicago	23.50-24.00
St. Louis	21.50-22.00

SPRINGS

Ruffalo	25.00-25.50
Chicago, coil	24.75-25.25
Chicago, leaf	23.50-24.00
Eastern Pa.	26.00-26.50
Pittsburgh	26.75-27.25
St. Louis	23.25-23.75

STEEL RAILS, SHORT

Birmingham	20.00
Buffalo	27.00-27.50
Chicago (3 ft.)	24.00-24.50
Chicago (2 ft.)	24.50-25.00
Cincinnati, dealers.	25.25-25.75
Detroit	†22.50-23.00
Pitts., 2 ft. and less	26.75-27.25
St. L. 2 ft. & less.	24.00-24.50

STEEL RAILS, SCRAP

Birmingham	18.00
Boston district	†15.75-16.00

Buffalo	22.00-22.50
Chicago	20.00
Cleveland	24.00
Pittsburgh	22.00 (nom.)
St. Louis	20.00-20.50
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	14.50-15.00
Cincinnati, dealers.	13.25-13.75

RAILROAD GRATE BARS

Buffalo	14.50-15.00
Chicago, net	14.00-14.50
Cincinnati, dealers.	12.75-13.25
Eastern Pa.	20.00-20.50
New York	†13.00-13.50
St. Louis	15.00-15.50

RAILROAD WROUGHT

Birmingham	16.00
Boston district	†11.75-12.25
Eastern Pa., No. 1	20.50-21.00
St. Louis, No. 1	14.25-14.75
St. Louis, No. 2	16.50-17.00

FORGE FLASHINGS

Boston district	†13.50-14.00
Buffalo	19.00-19.50
Cleveland	18.50-19.00
Detroit	†16.50-17.00
Pittsburgh	20.00-20.50

FORGE SCRAP

Boston district	†12.75-13.00
Chicago, heavy	24.00-24.50

LOW PHOSPHORUS

Buffalo, plates	26.00-26.50
Cleveland, crops	26.00-26.50
Detroit, thin gage.	†15.00-19.50
Eastern Pa., crops.	25.50-26.00
Pitts., billet, bloom, slab crops	27.00-27.50
Toronto, dealers	13.50-14.00

LOW PHOS. PUNCHINGS

Buffalo	25.00-25.50
Chicago	24.00-24.50
Cleveland	22.00-22.50
Eastern Pa.	25.50-26.00
Pittsburgh	26.50-27.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over	
Birmingham	20.00
Boston	†18.50-19.00
Chicago	24.00-24.50
New York	†19.00-19.50
Eastern Pa.	26.00-26.50
St. Louis	22.50-23.00

STEEL CAR AXLES

Birmingham	18.00
Boston district	†20.00-20.50
Chicago, net	25.50-26.00
Eastern Pa.	27.50-28.00
St. Louis	25.00-25.50

LOCOMOTIVE TIRES

Chicago (cut)	23.50-24.00
St. Louis, No. 1	20.00-20.50

SHAFTING

Boston district	†19.75-20.00
New York	†21.00-21.50

Eastern Pa.	25.00-25.50
St. Louis, 1 1/4-3/4"	19.75-20.25

CAR WHEELS

Birmingham Iron	18.00
Boston dist., iron	†16.50-17.00
Buffalo, steel	24.50-25.00
Buffalo iron	21.50-22.00
Chicago, iron	20.50-21.00
Chicago, rolled steel	23.00-23.50
Cincin., iron deal.	19.50-20.00
Eastern Pa., iron	23.50-24.00
Eastern Pa., steel	26.50-27.00
Pittsburgh, iron	22.00-22.50
Pittsburgh, steel	26.75-27.25
St. Louis iron	21.75-22.25
St. Louis, steel	21.75-22.25

NO. 1 CAST SCRAP

Birmingham	19.50
Boston, No. 1 mach.	†19.00-19.50
N. Eng., del. No. 2	19.25-19.50
N. Eng. del. textile	22.00-23.00
Buffalo, cupola	20.50-21.00
Buffalo, mach.	22.50-23.00
Chicago, agri. net.	19.75-20.25
Chicago, auto net.	19.50-20.00
Chicago, rail'd net.	20.00-20.50
Chicago, mach. net.	21.00-21.50
Cincin., mach. deal.	21.50-22.00
Cleveland, mach.	24.00-24.50
Detroit, cupola, net.	†19.00-19.50
Eastern Pa., cupola	25.00-26.00
E. Pa., No. 2	22.50-23.00
E. Pa., yard fdry.	22.50-23.00
Los Angeles	16.50-17.00
Pittsburgh, cupola	22.50-23.00
San Francisco	14.50-15.00
Seattle	14.00-15.00
St. L., agri. mach.	20.00-20.50
St. L., No. 1 mach.	22.00-22.50
Toronto No. 1 mach., net dealers	†21.50-22.00

HEAVY CAST

Boston dist. break.	†17.50-18.00
New England, del.	20.00-20.50
Buffalo, break.	18.00-18.50
Cleveland, break, net	18.50-19.00
Detroit, auto net.	†19.50-20.00
Detroit, break.	†17.50-18.00
Eastern Pa.	22.50
Los Ang., auto, net.	13.00-14.00
New York break.	†17.00

STOVE PLATE

Birmingham	13.50
Boston district	†15.50
Buffalo	18.00-18.50
Chicago, net	14.50-15.00
Cincinnati, dealers.	13.00-13.50
Detroit, net	†13.00-13.50
Eastern Pa.	20.00-20.50
New York fdry.	†17.50
St. Louis	17.00-17.50
Toronto dealers, net.	†17.50-18.00

MALLEABLE

New England, del.	22.00-23.00
Buffalo	24.00-24.50
Chicago, R. R.	24.50-25.00
Cincin. agri., deal.	18.00-18.50
Cleveland, rail	25.00-25.50
Eastern Pa., R. R.	23.00-23.50
Los Angeles	12.50
Pittsburgh, rail	26.00-26.50
St. Louis, R. R.	21.50-22.00

Ores

Eastern Local Ore	
Cents, unit, del. E. Pa.	
Lako Superior Iron Ore	10.00
Foundry and basic 56-63%, contract..	
Foreign Ore	
Cents per unit, c.i.f. Atlantic ports	
Old range bessemer	\$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60
Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.

Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	\$23.50-24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c
F.O.B. Rio Janeiro.	
Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton, cif.	\$43.00-46.00

Manganese Ore	
Including war risk but not duty, cents per unit cargo lots.	
Caucasian, 50-52%	.....
So. African, 48%	57.00-60.00
Indian, 49-50%	60.00-63.00
Brazilian, 46%	54.00-55.00
Cuban, 50-51%, duty free	67.50
Molybdenum	
Sulphide conc., lb., Mo. cont., mines.	\$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 94, 95

Pittsburgh—Sheet output gained slightly over the past week as minor refinements began to show slightly better tonnage. Galvanized sheet output increased 1 point to 74 per cent. Most customers, either defense or non-defense, are being satisfied as to their immediate needs.

Cleveland—One company prides itself on making deliveries on schedule for many weeks, but many makers cannot live up to promises. Though in some cases galvanized sheets cannot be promised inside of 10 to 11 months, some small makers promise 6 to 8 weeks. Hot and cold-rolled sheets are on the same delivery basis, September. A large maker of sheets and strips reports March business at a higher rate than February.

Chicago — Orders for sheets and strip were slightly increased last week. While orders are somewhat fewer, tonnage is larger. Situation for stainless sheets and strip is growing more acute with inadequate nickel supplies restricting production. Deliveries on hot rolled, cold rolled and galvanized sheets have advanced from 20 to 24 weeks to 6 to 8 months, and wide strip from 4 to 5 months to 5 to 6 months.

Boston—Narrow cold strip bookings continue heavier than shipments, but there are indications of some slowing down in buying. Incoming tonnage some days is falling below the average of recent weeks. Stainless, other alloy and electric furnace strip volume is now practically on a 100 per cent priority basis.

New York — Increasingly heavy defense work is playing havoc with schedules of most sheet producers.

Most producers of narrow cold strip are sold up to September on numerous finishes, although in some cases shipments are promised in 16 weeks on carbon stock. Buying is now largely against estimated fall requirements. Priorities are entering into production increasingly, resulting in flexible, but confusing operating schedules.

Philadelphia—Orders for fourth quarter delivery are more numerous as third quarter capacity is absorbed steadily. Users find it difficult to increase inventory as mills seek to spread available tonnage and are accepting business only in proportion to consumer needs. Restriction in available chrome-nickel sheets for other than defense use is inducing stainless consumers to increase demand for straight chromes.

Cincinnati—Sheet backlogs steadily expand although it is certain that adjustments will be made in orders tentatively booked for third and fourth quarter. These will be



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Never before such a hoist at such a price! It's full electric with push-button control, two brakes, safety type limit switch—all the quality features formerly found in only the most expensive hoisting equipment. Capacities from 250 to 2000 lbs., with bolt, hook or trolley suspension. It's built by P&H—for more than 55 years America's largest builder of overhead handling equipment.

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strictly rationed before being entered. Pressure for deliveries is increasing, in part because of strong demand from automotive interests. Price discussions are merely academic; announcements are still deferred.

Toronto, Ont. — Sheet buying is the dominating feature of the steel market, with mill backlogs piling rapidly and deliveries on new orders running well into last half. Automotive buying continues heavy, while a new rush of orders is developing from implement makers.

St. Louis—Flow of orders for sheets and strip continues unabated, and despite capacity opera-

tions and heavy shipments, backlogs are growing and deliveries become further extended. Mills are closely eyeing presumptive requirements of customers, and are endeavoring to prevent undue accumulations of consumer stocks. The galvanized situation is reported progressively tight.

Plates

Plate Prices, Page 94

Pittsburgh—Since virtually all plates are included in the classifications of ship plates and armor plate,

as shown in the priorities critical list released last week, producers here are waiting for some definite word as to the effects upon the plate market. Consensus here is that from now on virtual mandatory priority will be placed on all plate products.

Cleveland—Narrow plates are in the class with wide plates for extended delivery, usually September at the earliest. Because of changing of extras on widths, lengths, quantities, etc., usually without formal announcement, consumers are paying \$2 per ton higher than a year ago, though base prices are unchanged.

Chicago—Plate requirements are widening and orders are increasing. Fabricators of machinery and heavy equipment are booked late into the year and are pressing for deliveries.

Boston — Plate fabricators, except shipbuilders, are placing forward orders at open prices with little hope of delivery before third quarter on most sizes. Releases by shipyards are heavier and a large new tonnage is being allotted for the Charlestown and Portsmouth yards. Miscellaneous demand and consumption are stronger.

New York—The rush of releases for ship work in particular is forcing delivery schedules on plates further ahead. Some sheared plates are still available for late third quarter shipment, but these are fast becoming the exception. Some sellers have little tonnage available for the remainder of the year, particularly those closely allied with shipbuilding.

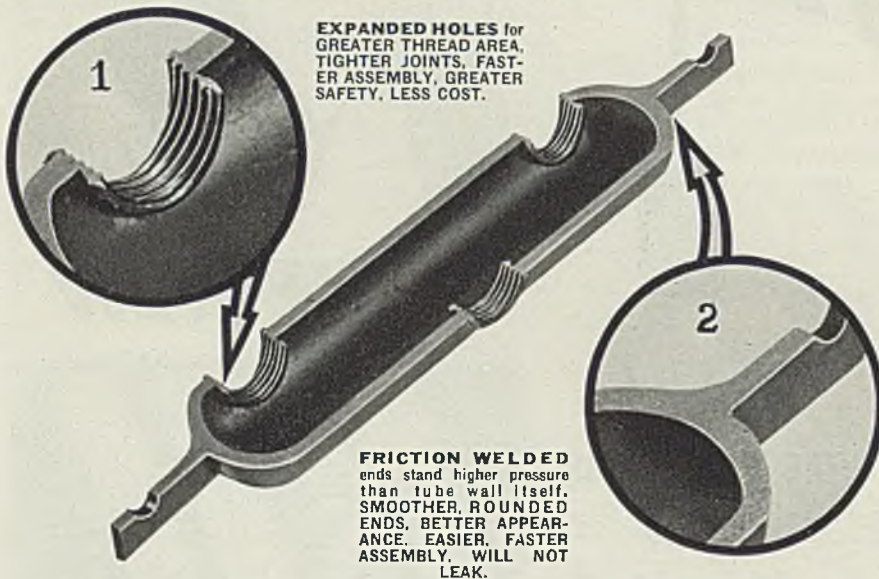
Contracts for all-welded steel floating workshops for the navy, first units of this type to be constructed, have been let to the J. K. Welding Co. Inc., Brooklyn, \$491,000, and Dekom Shipbuilding Corp., New York, \$440,000. These floating machine shops will be of structural steel frame with plate siding and roof, each to require approximately 406 tons of steel. The shops will be built without self-propulsion and will be towed from port to port, singly or in groups, depending on ship repair and needs.

Philadelphia—Plate deliveries are tight with no relief in sight, defense work accounting for a growing share. With few exceptions deliveries average four months or longer.

San Francisco — Plate awards were confined to lots of less than 100 tons and few inquiries of size are pending. So far this year 209,216 tons have been placed, compared with 15,780 tons for the corresponding period in 1940.

Toronto, Ont. — Canada's naval and merchant marine programs, calling for extensive ship construction, are creating specially heavy demand for plates and government and private inquiries are numerous.

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Where can these patented features save money and speed up production for you?

Over 90% of the stove manufacturers have adopted manifolds of this type. The cross section above illustrates our patented method of expanding and tapping holes and our method of friction welding tube ends. This process in many cases has eliminated the use of expensive cored castings. We are also equipped to bend pipe.

If your product is one where this type of tube assembly would seem applicable, don't hesitate to ask us about it. We will gladly work with you on any problem you have.

PRODUCTION PLATING WORKS, INC.

Manufacturers

Office & Works: 123-129 Main Street
LEBANON, OHIO

Railroad equipment builders that recently closed new contracts are said to be experiencing difficulty in obtaining plates.

Plate Contracts Placed

Unstated, 40 fuel and gas tanks for Pendleton, Oreg., air base, to Waltsburg Welding Works, Walla Walla, Wash.; W. C. Smith Co., Duluth, general contractor.

Plate Contracts Pending

757 tons, fabricated high-strength, low-alloy plates, Panama, schedule 4923, bids March 31, Washington; also 208 tons, fabricated structural beams and grillages, same schedule.

200 tons, 500,000-gallon tank and tower, Las Vegas airport, Las Vegas, Ariz.; bids opened.

200 tons, 500,000-gallon tank and tower, Phoenix military airport near Litchfield Park, Maricopa county, Ariz.; bids in.

Unstated tonnage, 42 4000-gallon oil storage tanks, signal corps, procurement district, army base, Brooklyn, Kaustine Co., Perryville, N. Y., low, \$139.21 each, bids March 14, cir. 540.

Unstated tonnage, 100,000-gallon elevated steel water tank, Drew Field, Tampa, Fla.; bids April 2, inv. 253, U. S. engineer, Tampa.

Bars

Bar Prices, Page 94

Pittsburgh—New business continues at a good rate, all producing units are at maximum output, and backlogs remain high. Stricter priorities on bar mill products are expected shortly as a result of the inclusion of all alloy steels on the priorities critical list last week.

Cleveland — Both alloy bars and carbon bars are in the same position on delivery promises, with August usually earliest available. Demand is among the briskest of the year. Automobile makers are beginning to buy for 1942 models.

Chicago—New business is somewhat stronger, in both carbon and alloy grades. Chief tightness in connection with alloys is the increasing shortage of nickel. Delivery dates now are in midyear or later.

Boston — Forward buying of carbon steel and cold-finished bars is maintained with most current bookings for third quarter delivery. While alloys are even more extended, growing volume of bookings are for defense contracts, taking preferential ratings. Consumption is heavier, having reached the highest peak since opening of the armament program. This is notably true of small arms makers. Machine tool shops are absorbing substantial volume of special steels and flow of material, frequently from secondary distributors, is maintained.

New York—Most contracting in carbon bars now is for fourth quar-

ter, producers being largely sold up for third quarter and in certain important instances for the greater part of fourth quarter as well. In alloy bars the situation generally is still more extended. On open-hearth alloy steels some producers have little to offer under 38 to 40 weeks; and on electric alloy steel 50 to 52 weeks.

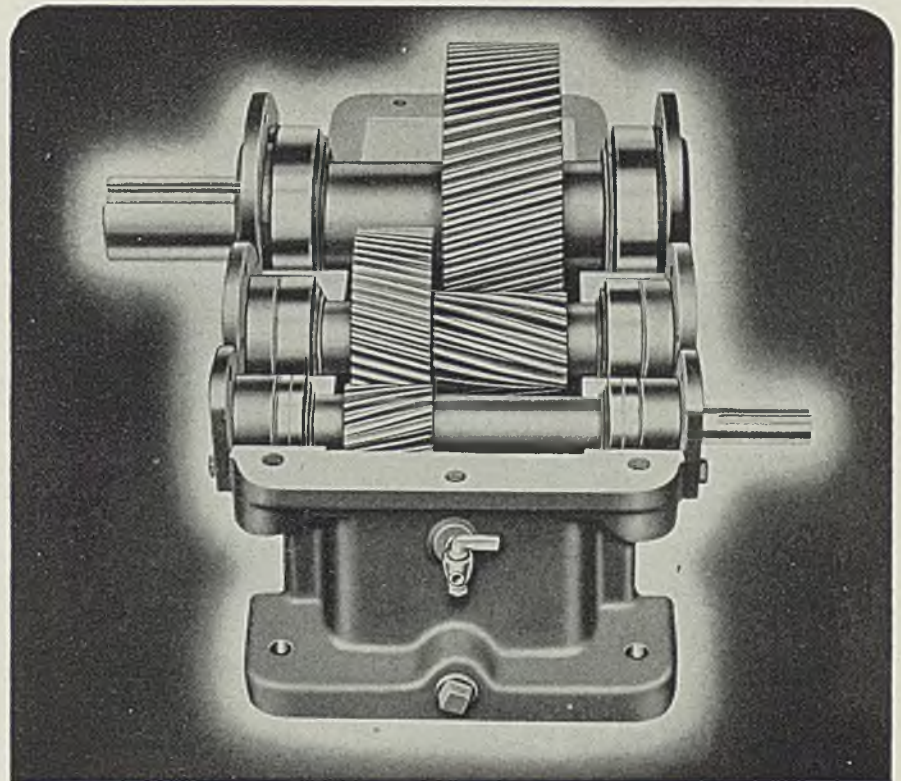
Philadelphia—Merchant bar demand is heavy and mills are unable to improve deliveries, which fall in July or later. Large tonnages move through warehouses to users requiring immediate shipment. Forging

shops are especially busy. Pennsylvania Forge Co., Philadelphia, has a navy contract to install \$2,500,000 worth of equipment for production of various types of forgings.

Pipe

Pipe Prices, Page 95

Pittsburgh—Pipe producers report they are preventing accumulation of stocks by consumers as far as possible by investigating all orders



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★ It's a two-way saving . . . in manufacturing because of the simplicity of design by Horsburgh & Scott engineers and . . . in maintenance and freedom from breakdowns because of the rugged and precision construction of every part from the finest materials. Investigate these H. & S. Helical Reducers with their lower first cost and longer trouble-free life.

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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

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on which there is a heavy backlog, such as alloy mechanical tubing. While pipe buyers are not able to get as much tonnage as they would like, no critical shortage has been reported.

Cleveland—Demand for merchant pipe for aviation fields and aircraft factories has been especially pronounced. Deliveries can be made in two weeks, thus virtually heading the list on promptness. Line pipe and casings are improving rapidly after usual winter dullness.

Boston — Demand for all types of light tubing is mounting, with deliveries on seamless and alloys

somewhat more extended. Requirements of the aircraft industry are substantial and fabricators of light vehicles, motorcycles and bicycles, have booked additional business.

New York—Decline in buying for army camp sites is partially offset by improved municipal demand for cast pipe and tonnage required for bases acquired in the destroyer deal with Britain has yet to be bought. Navy is distributing several thousand tons of cast iron and steel pipe for delivery at Key West and Florida City, Fla.

Birmingham, Ala.—Pipe plants are comfortably busy. Schedules

remain at five days a week, and bookings, while rather small, are numerous.

Cast Pipe Placed

500 tons, air base, Bangor, Me., to R. D. Wood & Co., Florence, N. J.

425 tons, various sizes, air base, Manchester, N. H., to Warren Pipe Co., Everett, Mass.

425 tons, 2 to 8-in., Menlo Park district, Portland, Ore., to United States Pipe & Foundry Co., Burlington, N. J.

350 tons, River Road district, Eugene, Ore., to United States Pipe & Foundry Co., Burlington, N. J.

300 tons, Marine drive improvement, Bremerton, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.; L. Coluccio, Seattle, general contractor.

200 tons, 12-inch, cement-lined, Panama, schedule 4890, to United States Pipe & Foundry Co., Philadelphia, bids March 17, Washington.

150 tons, 30-inch, housing project, Newport, R. I., to R. D. Wood & Co., Florence, N. J.

100 tons or more, annual contract, Quincy, Mass., to Warren Pipe Co., Everett, Mass.; also blanket contract, Cambridge, Mass., to same foundry.

Cast Pipe Pending

2612 tons, Pacific Beach pipe line, San Diego, Calif., 16 and 18-inch, class 200 and 250; United States Pipe & Foundry Co., Burlington, N. J., low.

950 tons, 2 to 10-inch, River Road district, Eugene, Ore.; Hugh G. Purcell, Seattle, for U. S. Pipe & Foundry Co., low for cast iron; alternates offered for wood and steel.

770 tons, 6, 8 and 10-inch, Watertown, Conn.

355 tons, sewer and water system, Municipal airport, Tucson, Ariz.; C. J. Dorfman, 124 North La Brea Ave., Los Angeles low on general contract at \$178,034.

300 tons, 8-inch, cement-lined, Boston; bids in.

250 tons, Avalon way improvement, Seattle; bids soon.

100 tons, 6 and 8-inch, Leominster, Mass.; bids in.

100 tons, 6 and 8-inch, West Springfield, Mass.

Steel Pipe Placed

570 tons, 3 to 10-inch seamless steel pipe, Long Beach, Calif., to Jones & Laughlin Steel Corp., Pittsburgh.

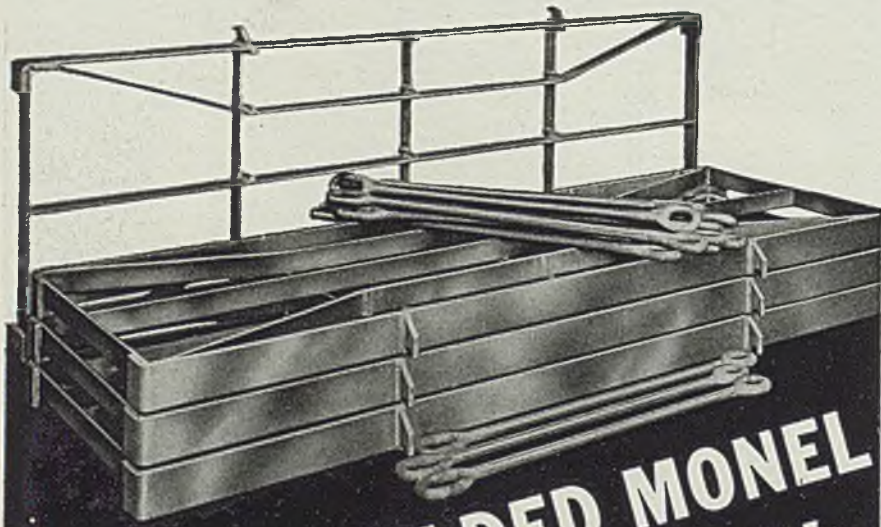
Steel Pipe Pending

345 tons, 1-inch black pipe, 1,185,000 feet at .5835 lb. per foot, Bureau of Reclamation, invitation 48,772-A, for delivery at Friant, Calif.; bids opened.

Wire

Wire Prices, Page 95

Manufacturers' wire and merchant wire products are in heavy demand, including automotive and aircraft needs and fencing. The latter is at the height of its season and 10 to 20 per cent heavier than last year on the average, some types even greater. Chain-link fence has been especially active, large quantities being required for



Made of WELDED MONEL
...they SPEED PICKLING!

4 all-welded Monel crates made by Youngstown Welding and Engineering Co., Youngstown, Ohio, for American Shim Steel Co., New Kensington, Pa. Designed for a load of 8,000 lbs., each crate weighs 552 lbs., hooks 28½ lbs. each.

Each of these four crates weighs 552 pounds. You know what size load old-fashioned crates of that weight would carry. What do you suppose these welded Monel units will safely handle? The answer is one that spells faster production. For each crate handles 4 tons of strip

Strong, sturdy and resistant to corrosion, they safely handle many times their weight

steel coils . . . about 14½ times its own weight.

Not only is production speeded, but costs are cut, and repairs and replacements reduced by all-welded Monel. Full information on request. Address:

THE INTERNATIONAL NICKEL CO., INC.
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enclosing new defense plants.

Shortage of zinc has been something of a handicap but in most cases stocks had been built up and buyers have obtained practically all the galvanized products they needed. An important maker has allotted shipments in the same ratio as he has been able to obtain zinc.

Delivery of merchant wire products has been good as practice is to build up stocks in the winter to meet spring demand. Current production is sufficient to allow immediate shipment. Barbed wire demand is about the same as for other fencing.

Wire rods present the most difficult problem, non-integrated wire-makers reporting deliveries tight and alloy steel rods almost unobtainable. Much of this situation results from inability of buyers to maintain safe inventory rather than from immediate needs.

No official price announcement has been made but customers have been told current prices will be extended unless unexpected factors require changes. Several producers have made an increase in loop bale ties, from column 56 to column 59.

Rails, Cars

Track Material Prices, Page 95

Railroad buying is led by 2500 cars by the Southern Pacific and 1400 by Baltimore & Ohio. Chicago, St. Paul, Minneapolis & Omaha has bought 700 cars and several other roads a smaller number. Locomotive buying continues, though in small lots or single units. Rail buying is slow, Western Maryland placing 2000 tons with two mills.

Locomotives Placed

Boston & Maine, three 380-horsepower diesel-electric, to General Electric Co., Schenectady, N. Y.

Chief of engineers, Washington, war department, ten 20-ton gasoline-driven locomotives to Fate-Root-Heath Co., Plymouth, O., \$125,250.

Piedmont & Northern, one 128-ton electric locomotive, to General Electric Co., Schenectady, N. Y.

St. Paul Union Depot, one 380-horsepower diesel-electric to General Electric Co., Schenectady, N. Y.

Locomotives Pending

Chicago, Milwaukee, St. Paul & Pacific, 16 diesel-electric locomotives; court permission being requested for purchase.

Navy, bureau of supplies and accounts, two diesel-electric locomotives and spares, delivery Boston, bids March 25, schedule 5828.

Car Orders Placed

Baltimore & Ohio, 1000 hoppers to General American Transportation Corp., Chicago; 250 box cars to Pullman-Standard Car Mfg. Co., Chicago; 150

cement cars to Greenville Steel Car Co., Greenville, Pa.

Chicago, St. Paul, Minneapolis & Omaha, 700 fifty-ton wood-sheathed box cars, to American Car & Foundry Co., New York.

Lehigh & New England, 100 covered hopper cars, to American Car & Foundry Co., New York.

Missouri Pacific, 11 stainless steel coaches to Edward G. Budd Mfg. Co., Philadelphia.

Navy, Bureau of Supplies and Accounts, six 70-ton flat cars with armor plate floors, to Haffner-Thrall Car Co., Chicago, bids Mar. 11, schedule 5581.

Southern Pacific, 2500 fifty-ton box cars, equally divided between Pullman-Standard Car Mfg. Co., Chicago; Pressed Steel Car Co., Pittsburgh; General American Transportation Corp.,

Chicago; Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.; Bethlehem Steel Co., Bethlehem, Pa.

Tennessee Coal, Iron & Railroad Co., 90 seventy-ton ore cars and 85 seventy-ton hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Western Maryland, 40 cement cars to American Car & Foundry Co., New York.

Car Orders Pending

Canadian Pacific, 250 fifty-ton twin hoppers; bids asked.

Delaware & Hudson, 500 cars; contemplated.

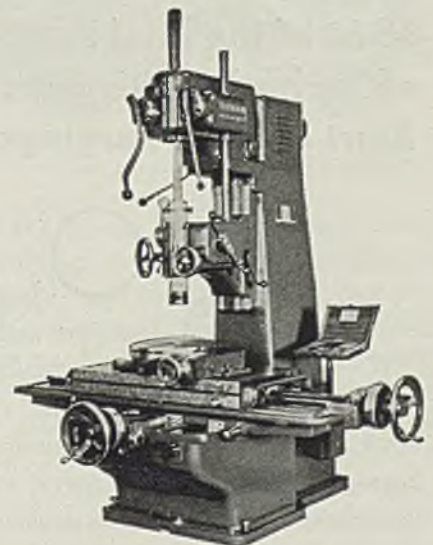
Navy, Bureau of Supplies and Accounts, Washington, two box cars, 50-ton capacity, delivery, Wickford, R. I.;

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Cleereman Machines Will Still Be Cutting Costs

When the rush of rearmament is past, and the world has turned to peacetime work, Cleereman Drilling Machines and Jig Borers, now being used to help speed America's defense program, will still be cutting costs.

The design, materials and workmanship in Cleereman Drilling Machines and Jig Borers are unexcelled. They assure accuracy and low cost production for many years of hard service.



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CLEEREMAN

DRILLING MACHINES and JIG BORERS

one, Corpus Christi, Tex.; one, Jacksonville, Fla., also one 10,000-ton car: bids Apr. 7, 4.

Rail Orders Placed

Western Maryland, 2000 tons, 1000 going to Carnegie-Illinois Steel Corp., Pittsburgh, and 1000 tons to Bethlehem Steel Co., Bethlehem, Pa.

Carboloy Revises Price Adds to Standard Line

■ Carboloy Co. Inc., Detroit, has added five new styles to its low-priced, mass-production line of standard tools. Available in 21

sizes, the new tools are carried in stock and consist of four offset types and a two-way square-shank turning style, all except the last in two grades, one for steel cutting and one for cast iron.

Revision in tool prices materially reduces cost on small quantity orders and the number of tools of one kind required to obtain minimum prices. Minimum prices are also reduced on all standard tools above $\frac{3}{4}$ x $\frac{3}{4}$ -inch shank size.

Addition of these five tools marks the completion of the first stage of Carboloy's new manufacturing and merchandising program, which was

started in August, when the first group of standard tools for mass production was announced, at lowered prices. Additional styles, formerly available only on special orders, are being standardized and will be available from stock for quick delivery.

Shapes

Structural Shape Prices, Page 94

Pittsburgh—Inquiries for structural products are somewhat heavier, with considerable tonnage for defense plants. While some interests here believe the peak on this work has been passed, inquiries continue heavy.

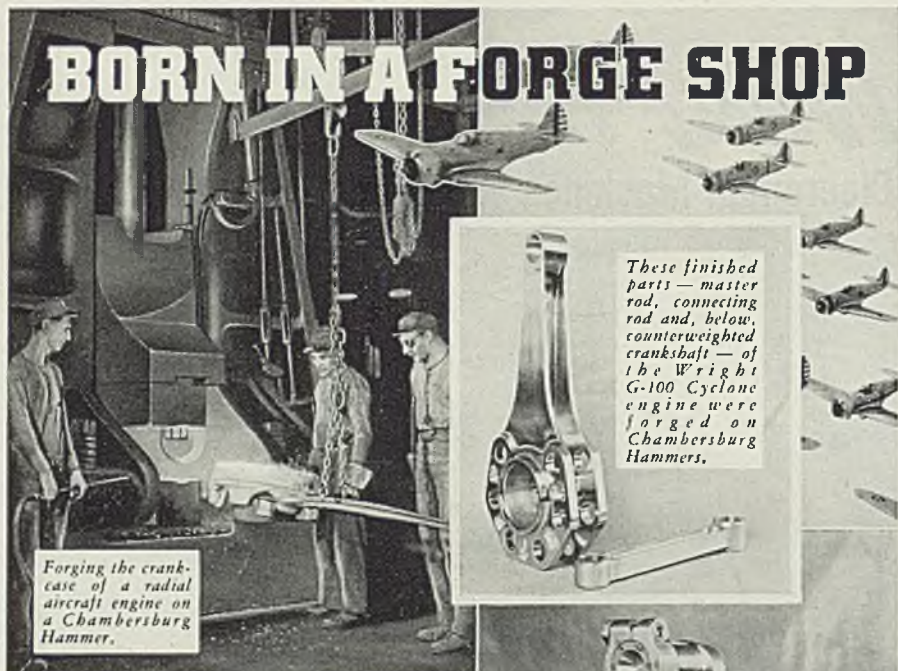
Cleveland—Fabricated structurals are still in poor current demand but fabricators expect a secondary wave of buying for erection of defense plants. Present business would be larger if fabricators could promise prompter deliveries. However the latter are in some cases improving and some builders are surprised by arrivals earlier than looked for.

Chicago—Fabricators have experienced another comparatively quiet week, with awards far below the average of recent weeks. In spite of this, shops are well engaged. With heavy backlogs, mills can do little better than midyear delivery or later.

Boston—Bids on several thousand tons of I-beams, channels, angles, tees and other structural shapes for the Portsmouth, N. H., and Boston navy yards were generally uniform and firm as were quotations on plates, sheets, strips and bars. Needs are included in approximately 105,000 tons of steel required by the navy on which bids were opened March 14.

Philadelphia—Shape deliveries were further extended last week after holding steady several weeks. This is believed to be the temporary result of placing a number of large defense contracts. Inquiries are relatively lighter and pending work is not growing.

Toronto, Ont.—Fabricated structural steel demand is gaining in volume despite efforts of the government to have private construction



Forging the crankcase of a radial aircraft engine on a Chambersburg Hammer.



These finished parts—master rod, connecting rod and, below, counterweighted crankshaft—of the Wright G-100 Cyclone engine were forged on Chambersburg Hammers.



Most of the Vital Parts of the Modern Airplane Start as Drop Forgings



○ NE way to speed up airplane production is through properly designed close-limit drop forgings produced in modern forge shops equipped with Chambersburg Hammers. ▲ If our projected defense program aggregated only 250,000

tons of drop forgings—a modest estimate—even a 5% saving would mean 1,000,000 hours of machining saved and 1,000,000 horsepower hours—as well as 12,500 tons of steel! ▲ Any forge shop equipped with Chambersburg Hammers can demonstrate how such savings can be made.

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.

Shape Awards Compared

	Tons
Week ended March 22	14,839
Week ended March 15	14,526
Week ended March 8	16,196
This week, 1940	16,768
Weekly average, 1941	34,384
Weekly average, 1940	28,414
Weekly average, Feb.	27,743
Total to date, 1940	232,985
Total to date, 1941	412,603

Includes awards of 100 tons or more.

CHAMBERSBURG

HAMMERS • CECOSTAMPS • PRESSES

use wood to release steel for war industries. Lettings last week were over 12,000 tons, with some 15,000 tons pending.

Shape Contracts Placed

- 2000 tons, boiler and turbine rooms, unit 18, Flisk street station, Commonwealth Edison Co., Chicago, to Bethlehem Steel Co., Bethlehem, Pa.
- 1700 tons, power house addition, Detroit Edison Co., Marysville, Mich., to American Bridge Co., Pittsburgh.
- 1200 tons, yard buildings, Oregon Shipbuilding Co., Portland, to Isaacson Iron Works, Seattle.
- 1200 tons, steel piling, drydock, Curtis Bay, Md., divided between Bethlehem Steel Co., Bethlehem, Pa. and L. B. Foster Co., New York, through Centaur Construction Co.
- 1150 tons, drydock No. 4, Philadelphia Navy Yard, to American Bridge Co., Pittsburgh, through Drydock Associates.
- 800 tons, factory, Continental Can, St. Louis, to Joseph Ryerson & Son Inc. Chicago, through Austin Co., contractor.
- 745 tons, addition, generating station, Connecticut Light & Power Co., Devon, Conn., to Bethlehem Steel Co., Bethlehem, Pa.
- 700 tons, inspection shed, Board of Transportation, Brooklyn, N. Y., to Harris Structural Steel Co., New York, through Thomas Waters Co., New York.
- 600 tons, net storage building, for navy, Long Beach, Calif., to American Bridge Co., Pittsburgh.
- 600 tons, plant addition, for Sterling Engine Co., Buffalo, to Buffalo Structural Steel Corp., Buffalo.
- 600 tons, addition, furnace building, Electro Metallurgical Corp., Niagara Falls, N. Y., to Lackawanna Steel Construction Co., Buffalo.
- 500 tons, plants, Todd California Shipbuilding Co., Richmond, Calif., to Isaacson Iron Works, Seattle.
- 415 tons, New York Shipbuilding Corp., of which 210 tons, warehouse to Bethlehem Fabricators Inc., Bethlehem, Pa. and 205 tons, sheet metal shop, to Lehigh Structural Steel Co., Allentown, Pa.
- 400 tons, factory addition, Addressograph-Multigraph Corp., Euclid, O., to Pittsburgh Bridge & Iron Works, Rochester, Pa., through H. K. Ferguson Co., Cleveland.
- 375 tons, grade crossing elimination, Central Railroad of New Jersey, West avenue, Sewaren, N. J., to American Bridge Co., Pittsburgh; Hogan-Gaul Construction Co., Red Bank, N. J., contractor, \$209,980.63; bids Feb. 23, Trenton.
- 320 tons, galvanized switch structures, Watts Bar dam, TVA project, to International-Stacey Corp., Columbus, O.
- 300 tons, office building, National Gypsum Co., Buffalo, to Buffalo Structural Steel Corp., Buffalo.
- 230 tons, piling, power house addition, Detroit Edison Co., Marysville, Mich., to Bethlehem Steel Co., Bethlehem, Pa.
- 200 tons, new Lehr building and building addition, Thatcher Mfg. Co., Elmira, N. Y., to American Bridge Co., Pittsburgh.
- 200 tons, miscellaneous, storage buildings, Kingsbury ordnance plant, LaPorte, Ind., for government, Bates & Rogers Construction Corp., LaPorte, Ind., contractor, to Mississippi Valley Structural Steel Co., Decatur, Ill.
- 175 tons, additions, Thatcher Mfg. Co., Elmira, N. Y., to American Bridge Co., Pittsburgh.
- 170 tons, warehouse, Owens-Illinois Glass

Co., Long Island City, New York, to Belmont Iron Works, Eddystone, Pa.; John W. Ryan Co., New York, contractor.

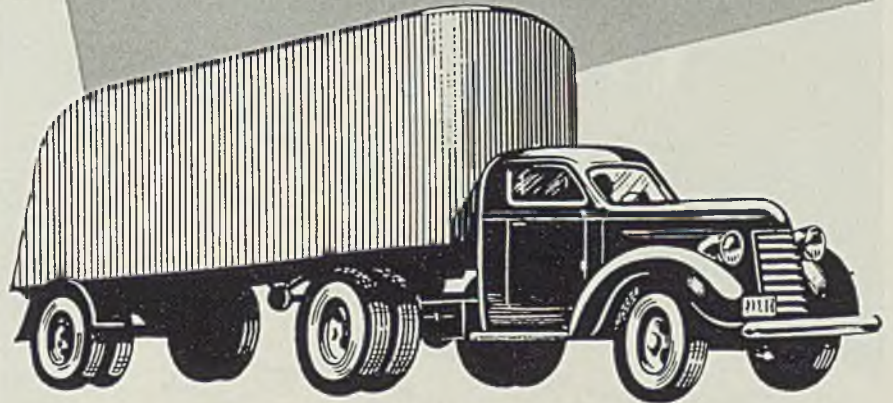
- 165 tons, building, Reading Sheet Metal Products Co., Reading, Pa., to Reading Steel Products Co., Reading, Pa.
- 160 tons, alterations to dryer building, Wood Conversion Co., Cloquet, Minn., to American Bridge Co., Pittsburgh.
- 145 tons, trash racks, Watts Bar dam, TVA project, to Lakeside Bridge Co., Milwaukee.
- 140 tons, Havemeyer street market buildings, Brooklyn, N. Y., to Mansfield Iron Works, Brooklyn, N. Y., through W. E. Anderson & Sons Inc., New York.
- 126 tons, sheet piling, Santa Barbara county, Calif., for state, to Bethlehem Steel Co., Los Angeles.
- 123 tons, state highway bridge, Monroe county, Wisconsin, to A. C. Woods &

- Co., Rockford, Ill.; bids Feb. 18.
- 100 tons or more, warehouses, Fort Sam Houston, Texas, to Mosher Steel Co., Houston; Dolph-Bateson Construction Co., Dallas, contractor; reinforcing steel awarded same fabricator.
- 100 tons, shapes and bars, state highway project, Wolcott-Morrissetown, Vt., to Vermont Structural Steel Corp., Burlington, and Bethlehem Steel Co., Bethlehem, Pa.; Lambert & George, Montpelier, Vt., contractors.

Shape Contracts Pending

- 2500 tons, transit shed, naval air station, San Diego, Calif., for navy.
- 2100 tons, addition, Huntley station, Buffalo Niagara Electric Corp., Tonawanda, N. Y.
- 2033 tons, sheet piling and 140 tons of shapes, Long Beach, Calif.; bids rejected and new bids being taken.

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ARMCO  **HIGH TENSILE STEEL**

1500 tons, five hangars, Washington national airport, Gravelly Point, Va.; bids April 3, Federal Works Agency, Washington.

1100 tons, bridge, Slauson avenue, Los Angeles, for army engineers.

1050 tons, grade crossing project, contract 6, Long Island railroad, Rockaway, N. Y.; Charles Vachris Co., New York, low on shapes and unstated tonnage of reinforcing bars.

827 tons, highway bridge, Eau Claire, Wis., L. G. Arnold, Eau Claire, Wis., low.

750 tons, extension, J. C. Weadock plant, Consumers Power Co., Essexville, Mich.

660 tons, doors and frames, Hermiston, Oreg., for government.

625 tons, girder renewal, Sixty-third street, Chicago, Chicago Rapid Transit Co.

610 tons, plate girder overpass bridge, Lebanon county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Mar. 28.

500 tons, plant, Standard Oil Co. of Indiana, Woodriver, Ill.

450 tons, grade crossing, Janesville, Wis., Jutton-Kelley, low.

400 tons, addition, American Magnesium Corporation, Buffalo; plans revised.

400 tons, state bridge FAP-450-C (1), Janesville, Wis.

400 tons, state highway bridge, Trumbull county, Ohio, at Columbus; bids March 25.

390 tons, laboratory, Public Service Electric & Gas Co., Maplewood, N. J.

370 tons, extension to yard crane, Bulard Co., Bridgeport, Conn.

325 tons, factory, Rock Island arsenal, Rock Island, Ill., for government.

324 tons, miscellaneous plain material for repairs, department of public works, City of Chicago; bids March 26.

300 tons, building, Coca Cola Bottling Co., East Hartford, Conn.

300 tons, three Oklahoma State highway bridges; bids April 15.

260 tons, state bridge, Front street, Hartford, Conn.

240 tons, state bridge FAGH-182-E (1), Pando, Colo.

220 tons, floor plates, etc., Pit river bridge, Redding, Calif., for Bureau of Reclamation.

210 tons, miscellaneous, sewage works, Ozone Park, Long Island City, N. Y., for New York City.

200 tons, plant addition, General Motors Corp., Rochester, N. Y.

200 tons, theatre and store, Guelich & Goebel Co., Amherst township, New York.

180 tons, oil storage house and truck garage, Curtiss-Wright Corp., Columbus, O.

170 tons, state bridge, route 53, section 539-SF, South Holland, Ill.

170 tons, state bridge, Front street, Hartford, Conn.; M. A. Gammino Construction Co., Providence, R. I., low, \$98,603.42.

159 tons, state highway bridge, FBI 21-13-2, C-1, Escanaba, Wis.; bids March 26.

150 tons, addition, Allegheny Ludlum Steel Corporation, Dunkirk, N. Y.

150 tons, additions to erection shop and shovel plant, Magor Car Corp., Clifton, N. J.

150 tons, six road bridges, Alaska Road Commission; bids to J. R. Ummel, purchasing agent, Seattle, April 1.

140 tons, yard tracks, bridge L-264, Lackawanna, N. Y., New York Central railroad.

130 tons, state bridge, route FA-12, section Q-1-VF, Smithboro, Ill.

120 tons, state bridge, FA-161, section 3-VF, Springfield, Ill.

110 tons, bridge 2418, Vincennes, Ind., Chicago & Eastern Illinois railway.

100 tons, Alcoa substation, Bonneville Project, Portland; Lehigh Structural Steel Co., New York, low.

100 tons, state highway bridge FBI 17-13-20, C-1, Chippewa county, Wisconsin; bids March 26.

Unstated, material for five heating plants, Fort Richardson, Alaska; bids to U. S. engineer, Seattle, March 24.

Unstated, supports for bus and switch assemblies, Coulee power plant; bids to Denver, March 18.

Unstated tonnage, four 150-foot radio towers, naval operating base, Norfolk, Va.; Arnold M. Diamond, Brooklyn, N. Y., contractor, spec. 10-331.

Semifinished Steel

Semifinished Prices, Page 95

Pittsburgh—Nonintegrated plants here are receiving essential raw materials, although buyers not regular customers have some difficulty. The pinch continues in alloy rods, and some delivery difficulty is reported in skelp.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 95

Cleveland—Sales are heavier than in February and for several months the sales volume has exceeded capacity. Operations are usually 100

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per cent and the pace throughout is greatest in years. Some makers have withdrawn salesmen from the road.

Reinforcing

Reinforcing Bar Prices, Page 95

Pittsburgh—Prices are strong both in mill and jobber market. Considerable tonnage is developing in lots under 100 tons, with a strong trend in large tonnages. Large proportion of current business is for defense with a substantial proportion of private construction.

Chicago — Demand for reinforcing steel has lifted somewhat but is still far below the level of earlier months. Largest order in the past few days was 1729 tons of bars for the Buick airplane engine plant at Melrose Park, Ill. At the moment, most jobs are of nondefense character. Road and bridge construction probably will begin on an extensive scale soon.

New York—While open bidding on small lots of concrete reinforcing bars for the procurement division, treasury department, reveals price shading, average quotations are firmer for construction work, notably outside the metropolitan district. Deliveries on intermediate grades of reinforcing bars are more extended. Export demand is substantial, one sale recently being made to Iceland.

Seattle—Small tonnages for private construction projects are fairly numerous but mills and dealers have so large a backlog that deliveries are uncertain.

San Francisco — A fair volume of reinforcing bar business was placed, 1182 tons, bringing the aggregate to date to 15,354 tons, compared with 24,787 tons for the same period last year.

Reinforcing Steel Awards

1729 tons, airplane engine plant, Buick Motor Division, General Motors Corp., Chicago, Thorgersen & Eriksen, Chicago, contractor, to Calumet Steel Co., Chicago.

1300 tons, St. Louis housing project, Carr

Concrete Bars Compared

	Tons
Week ended March 22	11,889
Week ended March 15	7,706
Week ended March 8	17,722
This week, 1940	7,804
Weekly average, 1941	10,524
Weekly average, 1940	9,661
Weekly average, Feb.	9,402
Total to date, 1940	87,170
Total to date, 1941	126,284

Includes awards of 100 tons or more.

street, to Sheffield Steel Corp., Kansas City, Mo., through Dunn Construction Co., Kansas City, contractor.

900 tons, foundations, Fort Greene housing project, Brooklyn, N. Y., to Fireproof Products Co., New York, through Corbetta Construction Co., New York.

850 tons, drydock, Curtis Bay, Md., to Bethlehem Steel Co., Bethlehem, Pa., through Centaur Construction Co.

750 tons, central heating and power plant, Fort Richardson, Alaska, to Seattle Steel Co.; Bethel, McCone & Parsons Corp., Los Angeles, contractors.

721 tons, Panama, schedule 4881, to Bethlehem Steel Export Corp., New York; bids Mar. 11, Washington.

650 tons, asphalt plant, Manhattan, New York, to Bethlehem Steel Co., Bethle-

hem, Pa.

575 tons, Bureau of Reclamation, inv. 48,759-A, Friant, Calif., to Columbia Steel Co., San Francisco.

500 tons, housing project, Providence, R. I., to Northern Steel Co., Boston.

400 tons, foundry, Kohler Co., Kohler, Wis., to Worden-Allen Co.; Permanent Construction Co., contractor.

350 tons, Howard field air base improvements, Panama Canal Zone, to Bethlehem Steel Co., Bethlehem, Pa., through N. P. Severin Co.

300 tons, plant Continental Can Co., St. Louis, Austin Co., Chicago, contractor, to Laclede Steel Co., St. Louis.

300 tons, two railroad underpasses, Adams county, Colorado, to Colorado Fuel & Iron Co., Denver; Horner & Monaghan, contractors.

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300 tons, plant, Singer Mfg. Co., Elizabeth, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through Austin Co., Cleveland.

280 tons, New York avenue viaduct, Pennsylvania railroad, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; James McGraw Co., contractor.

250 tons, Longview Place housing project, Decatur, Ill., George Sollitt Construction Co., Chicago, contractor, to Sheffield Steel Corp., Kansas City Mo.

230 tons, factory addition and tunnel, Chevrolet Motor Co., Flint, Mich., to Truscon Steel Co., Youngstown, O.; Christman Co., contractor.

200 tons, Navy yard requisition 13-1099, Portsmouth, Va., to Virginia Steel Co.

200 tons, telephone garage and warehouse, Western Electric Co., Portland, to unstated Portland houses; L. H. Hoffman, Portland, contractor.

181 tons, Reserve street bridge, state project 5950, St. Paul, to Bethlehem Steel Co., Bethlehem, Pa.

178 tons, Bureau of Reclamation, inv. B-46,491-A, Kremling, Colo., to Inland Steel Co., Chicago.

150 tons, offices, Washington Gas Light Co., Washington, to Hudson Supply & Equipment Co.; James Baird, contractor.

147 tons, office building and terminal, United Air Lines, Chicago, to Truscon Steel Co., Youngstown, O., through Charles B. Johnson & Son Inc., Chicago.

137 tons, Bureau of Reclamation, inv. 32,998-A, Tucumari, New Mex., to Sheffield Steel Corp., Kansas City Mo.

111 tons, factory, Woodward Governor Co., Rockford, Ill., Siostrom Construction Co., Rockford, Ill., contractor, to Ceco Steel Products Corp., Chicago.

100 tons, armory, Springfield, Mass., to Concrete Steel Co., New York.

100 tons, ramp, routes 109 and 49, Brooklyn, N. Y., to Truscon Steel Co., Youngstown, O.; Rusclano & Sons, contractors.

Reinforcing Steel Pending

2265 tons, improvement Los Angeles River between Fourth and Aliso streets, Los Angeles; bids Mar. 27.

2000 tons, Navy yard drydock, Philadelphia.

1500 tons, naval ordnance plant, Hudson Motor Co., Macomb county, Michigan.

1200 tons, power station, Duquesne Light Co., Wireton, Pa.

1000 tons, elevator, G. L. F. Mills Inc., Buffalo.

700 tons, grain elevators, GLF Holding Corp., Buffalo.

460 tons, retaining wall, Hartford, Conn.; bids March 24 to State Highway Commission.

400 tons, warehouse, G. C. Murphy Co., McKeesport, Pa.

338 tons, warehouse, Schuster's stores, Milwaukee; bids March 18.

373 tons, delivered f.o.b. military reservation, Narragansett, R. I.; bids March 24, inv. 194, U. S. engineer, Providence, R. I.

250 tons, forge and heat treating shop, Rock Island arsenal, Rock Island, Ill., for war department; bids March 31.

240 tons, Ohio state project No. 4, Hardin and Union counties; Churchill Bros. Co., Lima, O. low; bids March 18.

235 tons, mill addition, Collins & Aikman Corp., Bristol, R. I.

208 tons, Oaklanden reservoir, City of Indianapolis; bids March 31.

196 tons, project 12, Lake county, Ohio; bids March 25.

150 tons, concrete spans in Adams and Ferry counties, Washington; bids to Olympia, April 1.

138 tons, project 13, Trumbull county, Ohio; bids March 25.

120 tons, Emge Packing Co., Fort Branch, Ind.

119 tons, state highway bridge 2128, Rush county, Indiana, William Scheirer, Frankfort, Ind., low.

113 tons, bridge, R-149, Sec. 1, Lebanon county, Pennsylvania.

110 tons, sewer, Bronx, N. Y.; bids in.

110 tons, plate girder overpass bridge, Lebanon county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Mar. 28.

108 tons, water works and sewage treatment plant, army airport, Ft. Wayne, Ind., war department, Crouse & Saunders, Detroit, contractor; bids March 15.

104 tons, highway project, Newington-Wetherstfield, Conn.; D. V. Frione & Co., New Haven, low, \$195,290.68; bids March 17, Hartford.

100 tons, addition, sewage disposal plant, Cheektowaga, N. Y.; bids March 31.

100 tons, three Oklahoma State highway bridges; bids April 15.

100 tons, Edison vocational school, Seattle; Hans Ness, Seattle, low, \$141,191.

100 tons, state highway construction, route 23, sec. 27A and 28A, Sycamore, Dekalb county, Illinois, Milburn Bros. Inc., Mt. Prospect, Ill., low; bids March 14.

Unstated, 500,000 gal., concrete water tank for Camas, Wash.; Frank Watt Construction Co., Portland, low \$15,700.

Unstated, warehouse, garage and shop building, Bonneville dam; Drake, Wyman & Voss, Portland, low \$112,000, to U. S. engineer.

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SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL
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Pig Iron

Pig Iron Prices, Page 96

Pittsburgh—Pig iron situation is becoming critical, with virtually no merchant iron available and little prospects of increased tonnage for the near future. There are now 50 stacks of 55 active in the district. Of the five idle-stacks, four are owned by Carnegie-Illinois Steel Corp. and rehabilitation work is going forward on all of these, with the first one at Carrie works expected to begin operation sometime in April. The remaining stack is a small merchant furnace formerly owned by Colonial Iron Works at Riddlesburg, Pa., and now in the hands of the RFC. There are no immediate plans for this, although several interests have been considering putting it into operation.

Cleveland — Shipments are increasing. Much second quarter iron has been sold at prices prevailing when shipped. Price is a minor consideration. Consumers still get sufficient material, though often have to use substitute analyses. Producers take credit for having rationed iron in a manner to provide plenty for all.

Chicago—Pig iron sellers here have not yet officially opened books for second quarter tonnage, such action apparently being delayed until some announcement is made on steel prices and there is a better understanding of wage rates. Meantime, some sellers are accepting limited orders for merchant iron at prices prevailing at time of delivery. Coke, which because of its bulk can not be stocked in quantity is extremely tight and shipments are running several days behind.

Boston—Pig iron consumers are taking all first quarter contract tonnage available or allocated, but shipments for the period would be heavier but for restrictions by producers. All iron booked for first quarter will not be shipped but the carryover will not be large. While little second quarter business has been closed consumers in numerous instances are informing furnaces of expected requirements covering that period.

Philadelphia—Shipments of pig iron are fairly close to schedule but demand is not being completely met. Inquiries are still appearing, some reflecting consumers' failure to anticipate near future needs. Foundries are unable to substitute scrap to large extent, because of scarcity and high price of cast grades.

Cincinnati — The pig iron situation is tight but no serious shortage has appeared. Furnace interests, even if necessary to buy iron for resale, are filling specifications of regular customers for tonnage

actually needed. Meanwhile books have not been opened for second quarter. Inquiries are plentiful; melters find difficulty, however, in placing forward commitments.

Buffalo—No official price announcement for second quarter is expected. Producers appear more intent on keeping all melters supplied than in booking tonnage. Melt continues brisk with inventories generally low.

St. Louis—Aside from continued steady increase in melt and growing tightness in supplies, the pig iron situation in this area shows no change. Shipments are steady, well distributed and at a high rate.

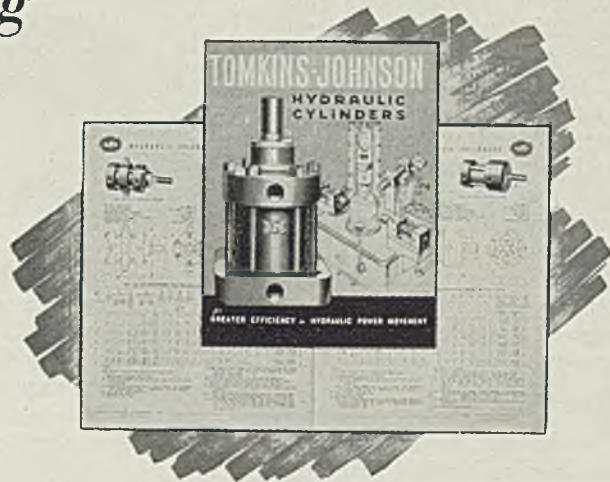
So far as can be learned no one is suffering from lack of supplies, and in some instances, consumer reserve stocks are of fair size.

Tin Plate

Tin Plate Prices, Page 94

Tin plate prices probably will be extended for second quarter, it is understood in absence of official announcement. Price is a secondary consideration at present, in view of heavy demand, which still continues. Current operations for the entire industry are about 80 per

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Caught In The Act

■ While trying to decide what to have on the *table d'hote combination* one evening last week on our way back from Pittsburgh on the Pennsy, we were quite intrigued to have a gentleman sit down opposite and open up the current issue of STEEL. First scanning over the "Highlights" to see what was particularly hot, our reader then moved in on "Mirrors of Motordom" followed by "Windows of Washington." While we were deciding on lamb chops, and feeling very much like Sherlock Holmes, he closely scrutinized the "Activities of Steel Users and Makers," "Men in Industry" and several news items. Half way through our fruit cup, he pulled out a pencil and started checking the government awards item for item and jotting down hieroglyphic notes beside some of the larger ones. "There," we said to ourselves, "is readership in the raw," and wondered what would happen next. Unfortunately for science, his tomato juice called a halt to further reading and we introduced ourselves. "Oh yes," said R. C. Manning, Sales Manager, Rotor Tool Co., "I've read STEEL for a number of years—good paper, too."

What Goes On!

■ On the other hand earlier last week our readership sleuthing came to no such end. Hopping a trolley car to run an errand uptown, we found ourselves sitting across from a very attractive young thing whose well-powdered nose was buried deep in that same current issue of STEEL. Maybe we've lost our nerve, or something, because there we sat doing absolutely nothing until we rode a block past our stop. Surely she can't be our typical reader, can she? Or, have we been just going on for years stone blind?

Soft Engineering

■ That reminds us of the new branch of engineering Saks Fifth Avenue has been promoting in some of their advertising—*Soft Engineering*, and it may in some

way account for that feminine readership we mentioned above. Edith Lances seems to be their chief design engineer, working to mold what the French apparently call finer *Poitrines*, and using for materials—silks and satins, wire and laces. The basic principle is not the cantilever but the uplift, and from there on the copy gets very, very feminine but you undoubtedly have grasped the idea by now.

They Asked For It

■ In honor of the new air transport service between Pittsburgh and Birmingham, the airline decided to load the first plane south with typical Pittsburgh products. Accordingly its representative approached several industrial firms for samples, including one of the steel companies. When one of the top execs was asked what to do, he replied, "Sure, give 'em a rail!"

Inventor

■ Which leads us to the story of another steel tycoon, who along with four or five other high-ups in various industries, went on a fishing trip last year. Everything was fine except that one of the gentlemen turned out to be a very, very bad snorer. The first night they threw shoes at him but it didn't work. The second night they took turns rolling him over on his side when he got on his back but he always rolled right back. After several nights with no sleep they all gave up and came home in such terrible shape their wives were sure they'd been up to no good. So, the steel tycoon thought it over and got an idea, which he went to work on with the cooperation of the Lewis & Conger Sleep Shop. Between them, they evolved the Snore-Ball, which is a soft rubber ball with a whistle in it, attached to the back of the sleeper's pajamas. It thus keeps the snorer snoozing on his tummy, and the thing whistles when the pressure is taken off so the sleeping partner will know he's turned over and that it won't be necessary to kick him awake.

SHRDLU.

cent, considerably ahead of present consumption.

Orders have been pouring in from canmakers, packers, general line can users and for export. Supply from British mills is dwindling, putting heavier demand on domestic mills. A factor in the situation is the expected large can demand for food containers to supply the army.

Sufficient production is regarded as certain as there is more capacity than ever before and obsolete hot mills can be operated if necessary to increase output. Stocks are well balanced with current needs and much of present buying is for delivery late in the year. Meanwhile mills will strive to keep ahead of consumption.

Scrap

Scrap Prices, Page 98

Pittsburgh—Open-hearth scrap is considerably short of current demand. The market remains upset in view of the pending action on price differentials. Until some definite disposition is made of this problem, the Pittsburgh market will remain static. Prices continue to move up on blast furnace and cast grades, but all other grades reflect government control and prices are established firmly at these levels. Some brokers are buying above government levels against previously placed business.

Cleveland—Scrap receipts are dwindling as holders are slow to ship under present uncertainties. Cast scrap scarcity is accentuated and dealers have difficulty in satisfying needs of regular customers, although no distress has developed. Prices are firm at published levels.

Chicago—Strong demand and shortage of material are causing further strengthening of iron and steel scrap prices here. No. 1 heavy melting steel is now quoted at a flat \$20, this being the price paid on known mill purchases and the price which brokers are obliged to pay. Since available material is insufficient to satisfy brokers requirements in meeting contracts it is understood that as high as \$20.50 has been offered dealers. Likewise, it is rumored that mills have paid this price recently, but confirmation is lacking.

New York—Cast grades continue to display additional strength, with demand brisk. All material produced and appearing is being bought and shipped at higher prices. Steel grades are unchanged but buying is kept down by light supplies. Small dealers are slow to offer tonnage at prevailing prices. An announcement of district and grade differentials is expected Tuesday. Harris Structural

Steel Co., New York, made the best offer for wrecking several sections of elevated railroad structures in Brooklyn, N. Y., taking close to 20,000 tons, including 2000 tons of rails.

Philadelphia—Scrap dealers and consumers await government action in stabilizing prices. Some buyers delay purchases in hope of lower prices but are pressing for deliveries on contract. Insistent need for cast grades results in higher prices. Principal steelmaking grades are unchanged. Offerings are far from plentiful but recent weather has handicapped collectors and yard operations.

Detroit — Despite a strong market and spirited demand for scrap, dealers and brokers are cautious about making changes in prices until some decision is reached regarding price ceilings. Brokers are willing to buy tonnages at quoted prices, but will not pay more. Fisher Body's list of 430 cars of compressed sheet bundles brought somewhere between \$18.50 and \$19.00, according to unconfirmed reports. However, this material customarily brings a premium over other bundles because of high quality.

Cincinnati—Activity in iron and steel scrap is limited only by available supplies. Dealers are releasing tonnage as acquired, without speculative holding. Attention centered on a meeting last week for discussion of price differential proposals.

St. Louis — Available supplies of scrap are smaller and prices generally have advanced, the exception being heavy melting steel, which remained steady. The mark-ups were applied to steel specialties, sheets, borings and turnings, cast grades and railroad malleable. The two last grades are especially scarce and in strong demand, reflecting increased operations by gray iron foundries and other users.

Warehouse

Warehouse Prices, Page 97

Cleveland—Distributors still ship faster than they take in steel. For some the supply of structurals is better, while at the other end is scarcity of sheets. Stainless and alloy steels are hard to get. Sales are usually confined to regular customers.

Chicago — Warehouse sales are going into new avenues of consumption with national defense accounting for most. All products are in good demand and constitute chiefly fill-ins of material for fabrication.

Boston — For stainless sheets, plates and bars, warehouses in some cases have advanced prices moderately on shipments of 300

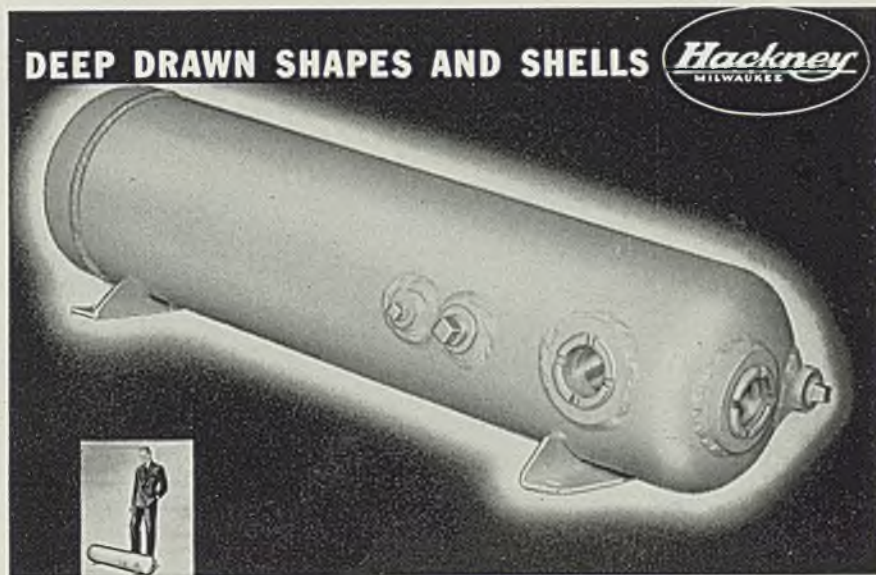
pounds or more, quotations being unchanged on smaller lots with usual extras applicable. Demand for steel out of warehouse continues heavy, covering a broad range, hot-rolled products and alloy specialties moving equally well.

New York — Revisions in warehouse prices for stainless sheets, plates and bars, by which jobbers no longer quote mill parity on these products, results in increases of several cents per pound in some brackets on lots of 300 pounds and over. Prices are advanced on heavier gages of cold-rolled strip, which in future will be sold on cold-rolled plate basis, as follows: For .203-

inch and heavier, New York metropolitan area, 8.50c, country district, 8.06c, f.o.b. Buffalo; .100 to .187-inch, inclusive, metropolitan district, 4.51c, country district, 4.05c, f.o.b., Pittsburgh; .095-inch and lighter, metropolitan area, 3.51c, country, 3.05c, Pittsburgh.

Philadelphia — Shipments from warehouse are limited only by tonnage of available material and rate of replacement. Stainless stocks are being conserved as replacement may be only for defense.

Buffalo — Additional broken sizes and lengthening of mill deliveries are causing concern in warehouse trade. Plates and alloys appear



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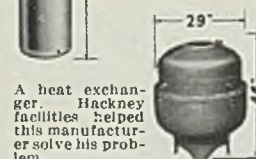
Your product, too, may be able to have its competitive advantages increased by a Hackney special part. Write us today for complete information—there is no obligation.

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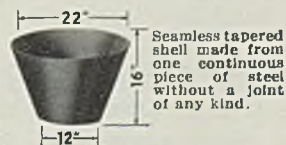
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TYPICAL SHAPES AND SHELLS DESIGNED AND PRODUCED BY HACKNEY

These condenser shells are among the Hackney products used by the refrigeration industry.



A heat exchanger. Hackney facilities helped this manufacturer solve his problem.



Seamless tapered shell made from one continuous piece of steel without a joint of any kind.

Containers for Gases, Liquids and Solids

"RACK INSULATION PERFECT!"

SAY PLATERS

**UNICHROME*
RACK COATING-W**

"Racks Show No Sign of Breakdown"

NEW YORK, March 24.—Further enthusiastic accounts of the remarkable protection afforded plating racks by United Chromium's "Unichrome" Rack Coating-W confirm early reports from leading platers.

"Unichrome Rack Coating-W still standing up fine after 11 months use in bright nickel and chromium solutions,"—"No sign of breakdown on any of our nickel plating racks,"—"finest material ever!"—are typical endorsements.

Advantages of this superior rack-coating material are:

1. Resistant to boiling cleaners and all plating solutions.
2. Tough—withstands wear and tear of handling.
3. Contains no ingredients harmful to plating solutions.
4. Cuts costs—reduces frequency of recoatings.
5. Easy to apply—"dip and force dry" method.
6. Light in color—easy to see how well the rack is covered.
7. Any part of rack can be recoated without recoating entire rack.

Write for Bulletin 20
Containing Complete Information

Platers without rack-coating facilities may have their racks coated with "Unichrome" Rack-Coating-W by Chromium Corporation of America, 4645 West Chicago Avenue, Chicago, Ill.; Belke Manufacturing Company, 947 North Cicero Avenue, Chicago, Ill.; or United Chromium, Incorporated, Waterbury, Conn.

UNITED CHROMIUM INCORPORATED

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hardest to get but structurals seem slightly better. Prices are steady and unchanged.

Cincinnati—Warehouse sales are increasing and problems in maintaining stocks are aggravated. Demand is spreading and sales are spurred by subcontracting of defense work, particularly by machine tool makers. Quotations are unchanged.

St. Louis—Sales by warehouses continue to expand. Demand for standard structural shapes, plates, bars and sheets is outstanding. Stocks of wire and wire products have been sharply reduced in recent weeks.

Seattle—Business is well diversified. On some items deliveries are slow. Prices generally are firm. Plates and bars are in especially strong demand. There is still a heavy movement of sheets although volume has tapered slightly, due to stocking before the recent price advance. Car lot business is increasing.

Curtails Brass Pipe To Save Zinc for Defense

American Brass Co., Waterbury, Conn., announces no further orders for Anaconda 67 brass pipe will be accepted. It may be obtained from

distributors' stocks as long as they last. Orders will be accepted for Anaconda 85 red brass pipe, copper pipe and copper tubes, types K and L. It is estimated that if all manufacturers adopt this policy additional zinc at the rate of 8,000,000 pounds per year will be made available for metals vital to defense.

Nonferrous Metals

New York—Establishment of official maximum prices for copper, lead and zinc at or close to prevailing levels is expected soon. This was revealed in a speech last Tuesday by Donald H. Wallace, price stabilization division, National Defense Advisory Commission. Buying of all metals appears quieter although demand still exceeds supply.

Copper—First allotments of March delivery from Metals Reserve Co.'s 235,000 tons of Latin American copper went to consumers last week and allocations of April delivery copper are being made. It is estimated that 90 per cent of copper is sold at 12.00c and that less than 10 per cent is sold at 12.50c, the former by the leading mine producer and the latter by custom smelters.

Lead—Consumption is still esti-

Nonferrous Metal Prices

Mar.	Copper			Straits Tin.		Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99% St. L.	Anti-mony Amer. Spot, N. Y.	Nickel Cathodes
	Electro. del. Conn.	Lake. del. Midwest	Casting. refinery	New York Spot	New York Futures						
15	12.00	12.00	12.25	52.25	51.25	5.75	5.60	7.25	17.00	14.00	35.00
17	12.00	12.00	12.25	52.12 1/2	51.12 1/2	5.75	5.60	7.25	17.00	14.00	35.00
18	12.00	12.00	12.25	52.25	51.37 1/2	5.75	5.60	7.25	17.00	14.00	35.00
19	12.00	12.00	12.25	52.37 1/2	51.62 1/2	5.75	5.60	7.25	17.00	14.00	35.00
20	12.00	12.00	12.25	52.87 1/2	52.12 1/2	5.75	5.60	7.25	17.00	14.00	35.00
21	12.00	12.00	12.25	52.50	51.75	5.75	5.60	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.00
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12
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Wire

Yellow brass (high)	19.73
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OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	9.00-9.25
Cleveland	9.25-9.50
Chicago	9.12 1/2 - 9.37 1/2
St. Louis	8.37 1/2 - 8.50

Heavy Copper and Wire

New York, No. 1	10.00-10.25
Cleveland, No. 1	10.00-10.50

Chicago, No. 1	10.25-10.50
St. Louis	9.62 1/2 - 9.75

Composition Brass Turnings

New York	8.75-9.00
----------	-----------

Light Copper

New York	8.00-8.25
Cleveland	8.00-8.25
Chicago	8.25-8.50
St. Louis	7.62 1/2 - 7.75

Light Brass

Cleveland	5.00-5.50
Chicago	6.12 1/2 - 6.37 1/2
St. Louis	5.00-5.25

Lead

New York	4.75-4.90
Cleveland	4.50
Chicago	4.62 1/2 - 4.87 1/2
St. Louis	4.25-4.50

Zinc

New York	7.50-8.00
Cleveland	5.00-5.50
St. Louis	4.50-4.75

Aluminum

Misc., cast, Cleveland	14.00
Borings, Cleveland	8.50
Clips, soft, Cleveland	16.50
Misc. cast, St. Louis	13.25

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l	13.25
Standard No. 12 aluminum (nom.)	19.50

mated at 65,000 tons per month while sales are maintaining a monthly rate of about 70,000 tons. Six cents is likely to be the maximum price compared with the present 5.75-cent level.

Zinc — The government hopes that the five per cent of total April zinc output being pooled may be enough to satisfy the most urgent military requirements of about 3000 tons.

Tin—Trading continued heavy in the Far East despite wide fluctuations in prices. Straits spot rose here to 52.87½c before easing on Friday to 52.50c.

Steel in Europe

Foreign Steel Prices, Page 97

London — (By Cable) — Domestic steel and iron production in Great Britain is being further stimulated and limitations on ordinary commercial consumers again have been tightened, leaving practically all tonnage available for war work. Shipbuilding is of the first priority rank.

Domestic output of semifinished steel is increasing but is still supplemented by imports. Tin plate exports are almost entirely connected with government oil and food requirements.

Equipment

New York — Heavy orders continue to reach shops and most tool and equipment builders are turning down all orders unless accompanied by definite priority ratings. Considering the severe strain on the machine tool industry in recent months, most shops are doing a remarkable job on deliveries. No delays or shortages are noted in steel and other supplies, machine tool builders being first in preferential ratings.

Marr-Galbreath Dissolve

■ Marr-Galbreath Machinery Co., 55 Water street, Pittsburgh, will sell at public auction April 22 its complete warehouse stock and discontinue business as a corporation. Sale will be conducted by Industrial Plants Corp. of Ohio. J. C. Marr will trade under his own name and M. D. Galbreath will trade as Galbreath Machinery Corp., with offices in the Empire building, Pittsburgh.

Ferroalloys

Ferroalloy Prices, Page 96

New York—Pressure from consumers for ferromanganese continues heavy, with sellers shipping full production. This situation also applies in several other major ferroalloys. Meanwhile, prices are un-

changed, and have been generally extended for next quarter.

Expansion of ferroalloy capacity is going ahead steadily, the latest important development being acquisition of a site near Portland, Oreg., by Electro Metallurgical Co. for the construction of a plant to manufacture calcium carbide and ferrosilicon, and possibly later on manganese and chrome-bearing alloys.

Week's Government Defense Awards

(Concluded from Page 44)

and sheets, copper-nickel-alloy tubing, \$342,077.91.
American Smelting & Refining Co., New York, slab zinc, (spelter) \$7795.
American Zinc Sales Co. Inc., New York, zinc slab, (spelter) \$10,910.
Anaconda Wire & Cable Co., New York, electric cable, \$28,544.
Atlas Diesel Engine Corp., New York,

marine diesel engines, \$21,193.
Baker-Raulang Co., Cleveland, electric and industrial trucks, \$7668.
Baldu Anchor, Chain & Forge Co., Chester, Pa., anchor chain; detachable links; outboard swivel shots; and shackle tool sets, \$465,952.15.
Bendix Aviation Corp., Pioneer Instrument division, Bendix, N. J., mercurial barometers, \$14,340.
Brown & Sharpe Mfg. Co., Providence, R. I., milling machine, \$7926.
Bryant Machinery & Engineering Co., Chicago, drilling and tapping machines, \$12,902.
Buffalo Forge Co., Buffalo, motor-driven bending roll, \$10,382.
Chambersburg Engineering Co., Chambersburg, Pa., machines, \$12,905.
Climax Engineering Co., Clinton, Iowa, generating plants, \$21,399.
Colvinox Corp., New York, engine preheater, \$17,100.
Cone Automatic Machine Co. Inc., Windsor, Vt., screw machines, \$28,196.
Crane Co., Chicago, bronze and composition valves, \$49,759.
Fairbanks, Morse & Co., Chicago, diesel engine and drive equipment, \$8894.60.
Flexitall Gasket Co., Camden, N. J., pipe flange gaskets, spiral wound metallic asbestos, \$39,568.96.
General Motors Corp., Cleveland Diesel



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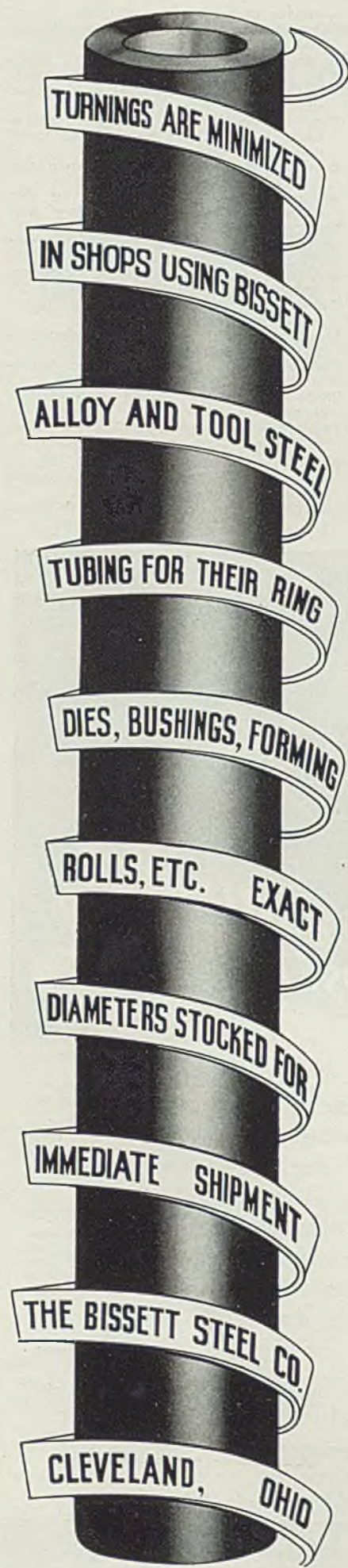
PAGE STEEL AND WIRE DIVISION

MONESSEN, PENNSYLVANIA

In Business for Your Safety



AMERICAN CHAIN & CABLE COMPANY, Inc.



Engine division, Cleveland, reconditioning of main propulsion engines, \$97,304.

Gould & Eberhardt, Newark, N. J., universal shapers, \$7242.

Gray Marine Motor Co., Detroit, gasoline marine engines, \$6000.

Hall-Scott Motor Car Co., New York, Hall-Scott "Defender" engines, \$51,646.76.

Higgins Industries Inc., New Orleans, radio transmitting, receiving equipment, \$86,525.

Imperial Machine & Foundry Corp., Lindenhurst, N. Y., electric vegetable peeling machines, \$29,492.

Ingersoll Rand Co., New York, air compressor, \$6582.

International Minerals & Metals Corp., New York, slab zinc, (spelter) \$7610.

Lidgerwood Mfg. Co., Elizabeth, N. J., winches, \$37,548.

McKiernan-Terry Corp., Harrison, N. J., anchor windlasses, \$260,773.

Midvale Co., Philadelphia, steel forgings, \$777,542.64.

Pittsburgh Steel Co., Pittsburgh, alloy steel tubing, \$126,656.15.

Revere Copper & Brass Inc., Baltimore, condenser tubes, rolled naval brass, \$146,644.79.

Ritter Dental Mfg. Co. Inc., Rochester, N. Y., dental units, \$55,377.50.

Sclaky Corp., Chicago, welding machines, \$53,995.

Seagrave Corp., Columbus, O., pumping fire engine, \$5500.

Seattle Chain & Mfg. Co., Seattle, chains and fittings, \$29,974.40.

Sellers, William, & Co. Inc., Philadelphia, planers, \$79,400.

SKF Industries Inc., Philadelphia, ball

bearings, \$5157.12.

Smith Booth Usher Co., Los Angeles, motor-driven millers and shapers, \$5100.

Somerville, Thomas, Co., Washington, seamless steel pipe, \$10,218.75.

Sperry Gyroscope Co. Inc., Brooklyn, N. Y., gyro compass equipment, \$525,395.18.

Square D Co., Kollsman Instrument division, Elmhurst, N. Y., aircraft accelerometers, \$234,000.

United States Motor Corp., Oshkosh, Wis., gasoline engine driven generator sets, \$10,165.

Van der Horst Corp. of America, Olean, N. Y., chromium plated liners, \$72,576.

Worthington Pump & Machinery Corp., Harrison, N. J., main condensate turbine pumps, turbine driven, and spare parts; air compressors, \$464,415.

Bureau of Yards and Docks Awards

Diamond, Arnold M., Brooklyn, N. Y., \$23,440 for radio towers at naval operating base, Norfolk, Va.

Judson Pacific Co., San Francisco, \$28,645 for two 10-ton and one 3-ton bridge cranes at Navy yard, Mare Island, California.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., two 10-ton bridge cranes at Navy yard, Mare Island, California, \$35,600.

Wigton-Abbott Corp. and Mahony-Troast Construction Co., Plainfield, N. J., \$3,000,000 for construction of a naval supply depot at Bayonne, N. J., on a cost plus fixed fee basis.

Construction and Enterprise

Ohio

ASHTABULA, O.—Empire Sheet & Tin Plate Co., Mansfield, O., has sold its plant on State road, idle since 1929, to Sheffield Steel Co., 1938 Shepherd avenue, Kansas City, Mo., which will raze buildings and move material to Houston, Tex., where it will be used in construction of new plant. R. L. Gray is president of Sheffield company.

CINCINNATI—Ohio Knife Co., Dreman avenue, plans to erect a two-story brick addition to its plant.

CLEVELAND — Lakeside Steel Improvement Co., 5418 Lakeside avenue, has bought adjacent property for further plant additions on plans by E. G. Hoefler, 5005 Euclid avenue. C. W. Derhammer is president and general manager.

CLEVELAND—Cleveland Tractor Co., East 103rd street and Euclid avenue, will make a second extension, to cover 3000

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 105 and Reinforcing Bars Pending on page 108 in this issue.

square feet floor space, at cost of \$5000. Sam W. Emerson Co., 1836 Euclid avenue, is contractor.

CLEVELAND—Euclid Road Machinery Co., E. H. Parkhurst, president, 361 Chardon road, has let general contract for a one-story 59 x 157-foot factory addition to A. M. Higley Co., 2036 East Twenty-second street, to cost about \$50,000. (Noted Feb. 24.)

CLEVELAND—Star Machine & Tool Co., J. C. Schurger, manager, 9320 Woodland avenue, has let general contract

for a one-story 45 x 100-foot plant addition to Alger-Rau Inc., 12434 Cedar road, to cost about \$40,000. (Noted March 3.)

CLEVELAND — Thompson Aircraft Products Co., Euclid, O., is taking bids until April 2 for a new plant, plans for which are by Albert Kahn Inc., New Center building, Detroit. (Noted Feb. 24.)

CLEVELAND—United States Fluorescent Co., 10408 Superior avenue, is being established to manufacture lighting fixtures by Carl Lortzman, 12721 Coronado avenue, who will be manager.

CLEVELAND—Tools & Gages Inc., 3106 East Sixty-third street, will build one-story addition 50 x 75 feet to increase production. William L. Warrander is secretary-treasurer.

COLUMBUS, O.—John Deere Plow Co., 130 East Naghten street, will let contract soon for a one-story 200 x 300-foot plant at Chambers and Olentangy River roads, to cost about \$500,000.

DAYTON, O.—National Cash Register Co., South Main street, has let general contract for a one-story 160 x 360-foot plant to Industrial Building Co., Riebold Building annex, to cost about \$225,000.

ELYRIA, O.—Western Automatic Machine Screw Co., Lake avenue and Baltimore & Ohio railroad, plans plant expansion for spring or summer. A. Green is in charge.

KENT, O.—Davey Compressor Co. has leased Besaw building, Water street, to provide additional space for production and assembly. Paul H. Davey is president.

MILLERSBURG, O.—Flexible Automobile Body Co., Loudonville, O., will move part of its manufacturing operations here to former McKome Tire & Rubber Co. plant. Hugo Young is in charge.

SHELBY, O.—Shelby Cycle Co. has given general contract to Stacy Haun

for two and three-story addition 60 x 120 feet.

Connecticut

BRISTOL, CONN.—New Departure division of General Motors Corp., 269 North Main street, will build a one-story 95 x 120-foot plant and warehouse, to cost about \$55,000.

MILFORD, CONN.—Maggl Co. Inc., 76 Varick street, New York, will build a four-story 100 x 180-foot and 100 x 200-foot food products plant. Fletcher-Thompson Inc., 1336 Fairfield avenue, Bridgeport, Conn., are engineers.

WATERBURY, CONN.—Waterbury Button Co., 835 South Main street, will build a two-story 77 x 90-foot addition to cost about \$45,000.

Massachusetts

NEW BEDFORD, MASS.—Revere Copper & Brass Co., 24 Front street, has let general contract to Sullivan Foster Inc., 43 William street, for a one-story 130 x 250-foot plate mill to cost about \$80,000. (Noted Feb. 24.)

SPRINGFIELD, MASS.—Wico Electric Co., Phelon avenue, has let general contract for a one-story 100 x 120-foot laboratory to Ernest F. Carlson Inc., 1694 Main street, to cost about \$50,000.

WESTBORO, MASS.—T. H. Hackett, special water commissioner, Town Hall, plans waterworks supply system, pumping station, water mains, etc., to cost about \$100,000. Whitman & Howard, 89 Broad street, Boston, are engineers.

New York

BROOKLYN, N. Y.—Atlantic Basin Iron Works, 988 Fifth avenue, New York, has plans by Walker & Gillette, 599 Madison avenue, New York, for alterations to a two-story machine shop at 150-86 Van Brunt street, at cost of \$110,000. H. Miller Jr., 599 Madison avenue, New York, is engineer.

BROOKLYN, N. Y.—Robins Dry Dock & Repair Co., Erie Basin, foot of Dwight street, has plans by Albert Kahn Inc., New Center building, Detroit, for a one and three-story 150 x 500-foot mill and factory building on Beard street, to cost over \$400,000.

New Jersey

BLOOMFIELD, N. J.—Newark Porcelain & Enameling Co., 265 Watsessing avenue, Newark, N. J., has plans by R. B. Flatt, 50 Broad street, for a one and two-story 32 x 150-foot addition.

HACKETTSTOWN, N. J.—Hatfield Wire & Cable Co., 4871 Hillside avenue, Hillside, N. J., is having plans made for a plant addition here.

IRVINGTON, N. J.—Art Tube Co., 50 Lyons street, has plans by R. B. Flatt, 50 Broad street, Bloomfield, N. J., for a one-story 20 x 300-foot plant and storage addition.

IRVINGTON, N. J.—Barnett Foundry & Machine Co., Lyons avenue, Herbert L. Edinger, vice president, suffered severe loss by fire in pattern storage building which damaged practically all of 10,000 patterns belonging to customers. Loss is placed at \$1,000,000.

PRINCETON, N. J.—Radio Corp. of America, 30 Rockefeller Plaza, New York, will build a radio research laboratory to cost about \$1,000,000.

RUMSON, N. J.—Boro council plans a sewage disposal plant at Hartshorne lane and Shrewsbury drive, to cost about \$70,000. G. Kallen, 60 Broad street, Red Bank, N. J., is engineer.

Pennsylvania

BELLEFONTE, PA.—National Gypsum

Co., 190 Delaware avenue, Buffalo, N. Y., will build a dehydrating plant, additional kilns, etc., at cost of about \$350,000.

BERWICK, PA.—American Car & Foundry Co. plans a 40 x 200 and 40 x 240-foot extension to its plant at cost of over \$100,000.

ERIE, PA.—Erie Forge Co., R. F. Devine, president, J. E. Koehl, purchasing agent, plans \$250,000 expansion program. Additions to machine shop, open-hearth and heat treating buildings will be 120 x 198 and 52 x 120 feet.

HARMONY, PA.—Fox Grinders Inc., J. B. Bair, treasurer, 1704 Oliver building, Pittsburgh, is having plans drawn for a one-story 60 x 80-foot addition.

YORK, PA.—General Electric Co., 463 South Albemarle street, Fred R. Kalmer, superintendent is building a one-story plant 100 x 200 feet for warehouse, to be used later for manufacturing, costing about \$90,000. Industrial Constructors' Co., Philadelphia, has contract.

Michigan

DETROIT—Sterling Gauge Co., 743 Beaubien avenue, has been incorporated with \$3000 to deal in dies and tools, by Paul Rethoret, 734 Neft road, Grosse Pointe, Mich.

DETROIT—Swiss Tool & Die Inc., 3916 Vermont avenue, has been incorporated with \$8100 capital to deal in tools and dies, by John M. Francon, 3217 Montgomery avenue.

Illinois

CHICAGO—W. A. Jones Foundry & Machine Co., 4401 Roosevelt road, has let general contract to H. E. Weede Construction Co., 1515 Howard street, for a two-story 76 x 92-foot addition costing about \$45,000. Niestadt & Love, 343

South Dearborn street, are architects.

CHICAGO—Knives & Saws Inc., 520 North Cicero avenue, manufacturer of woodworking bandsaws and paper-cutting knives, is building a one-story shop addition 25 x 49 feet.

CHICAGO—Chicago Gear Mfg. Co., 2823 West Fulton street, manufacturer of steel cast iron and nonmetallic gears, is building an addition 75 x 150 feet, costing \$150,000, to increase manufacturing facilities about one-third. (Noted Feb. 3.)

CHICAGO—Russakov Can Co., 850 North Ogden avenue, manufacturer of stampings and sheet metal specialties, is building a second-story addition to add 24,000 square feet to productive capacity. Will be equipped with sprinkler system, elevators and unit heaters. Cost is about \$75,000. Polrot Construction Co. is contractor.

EAST ALTON, ILL.—Western Cartridge Co. has retained Alvord, Burdick & Howson, 20 North Wacker drive, Chicago, to prepare plans for a 6,000,000-gallons per day water purification and softening plant.

LOUISVILLE, ILL.—Special election will be held soon on bonds for sewage treatment plant and connecting sewers at cost of about \$109,000.

ROCKFORD, ILL.—Rockford Screw Products Co., manufacturer of set screws, etc., has given general contract to Linden & Son, for a one-story addition 58 x 376 feet. Roland Wood, Melrose Park, is architect.

ROCKFORD, ILL.—W. F. & John Barnes Co., William M. Barton, president, manufacturer of machine tools, has given general contract to A. L. Jackson Co., 161 East Erie street, Chicago, for a one-story addition 120 x 220 feet. S. A. McNally & Associates, 105 West Mad-

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CHICAGO, ILL.

son street, Chicago, are architects.

ROCKFORD, ILL.—J. L. Clark Mfg. Co., manufacturer of tin containers, has given general contract to Security Building Co., Rockford, for a one-story addition 80 x 120 feet. Nimmons, Carr & Wright, 333 North Michigan avenue, Chicago, are architects.

Indiana

EVANSVILLE, IND.—Southern Indiana Gas & Electric Co., will build a six-story 42 x 68-foot power plant addition, including a 20,000-kilowatt turbo-generator and auxiliaries, to cost about \$600,000.

INDIANAPOLIS—War department announces contract has been let for \$11,000,000 plant for manufacture of brass

cartridge cases, to be designed, built and equipped by Bridgeport Brass Co., Bridgeport, Conn., H. W. Steinkraus, vice president.

NEWCASTLE, IND.—Ingersoll Steel & Disc Co., division of Borg-Warner, is building a plant addition 74 x 210 feet, to cost about \$50,000. An electric furnace and other equipment will cost an additional \$100,000. New cranes will be installed.

Maryland

BALTIMORE—Rustless Iron & Steel Corp., 3400 East Chase street, is negotiating with navy department for expenditure of \$725,000 for building to house annealing and pickling depart-

ments and new 25-ton electric melting furnace, to add 30,000 tons of ingots annually, bringing capacity to 120,000 tons.

Tennessee

CHATTANOOGA, TENN.—Tennessee Products Co., C. McFarlin, president, Alton Park, Tenn., has let general contract for a coke by-products plant to Wilputte Coke Oven Corp., subsidiary of Somet-Solvay Co., 40 Rector street, New York, to cost about \$1,800,000.

Virginia

NORFOLK, VA.—Virginia Electric & Power Co., Richmond, Va., has plans for expansion of its steam-electric power plant on Reeves avenue, including a turbine generator unit, high-pressure boiler and auxiliaries, to cost about \$4,000,000.

Missouri

ST. LOUIS—General Motors Truck & Coach Co., division of Yellow Truck & Coach Co., Pontiac, Mich., has given general contract to Boaz Kiel Construction Co., 4030 Chouteau avenue, for a one-story 215 x 256-foot distribution branch plant for trucks and motorbuses, costing \$200,000. Plans are by W. J. Knight & Co., engineers, Wainwright building, St. Louis.

ST. LOUIS—Busch-Sulzer Bros. Diesel Engine Co., 3300 South Second street, will build a one-story factory building 120 x 270 feet. Contract for substructure has been let to Smith-Cook Construction Co., 4829 Easton avenue, St. Louis, and structural steel to Stupp Bros. Bridge & Iron Co., 3800 Weber road, St. Louis. Bids will be taken soon on superstructure. Ford, Bacon & Davis, New York, are engineers.

WAYNESVILLE, MO.—City has received WPA funds for waterworks and distribution system costing about \$46,000. A special election will be held soon on bond issue for city's share of cost.

Wisconsin

AMERY, WIS.—City, F. A. Sylvester, clerk, has approved plans for a sewage disposal plant to cost about \$25,000. Herman T. Hagestad, River Falls, is consulting engineer.

GRANDON, WIS.—City, Chester Jackson, clerk, opens bids March 27 for a 30,000-gallon steel water tank on tower. Jerry Donohue Engineering Co., Sheboygan, Wis., is engineer.

GREEN BAY, WIS.—Hoell Machine Co. has given general contract to J. C. Basten for one-story factory 40 x 80 feet. Foeller, Schober, Berners, Safford & Jahn are architects.

MARSHFIELD, WIS.—City water and light commission, Edward F. Klipp, secretary, will build power plant, including turbine generator and auxiliary equipment.

MILWAUKEE—Stolper Steel Products Corp., automotive sheet metal parts, will soon award contracts for a one-story addition 100 x 250 feet at No. 2 plant on Fond du Lac avenue. F. F. Drolshagen, 647 West Virginia street, is architect.

MILWAUKEE—Stanek Tool & Mfg. Co. has given general contract to Erich Prag for additions and alterations to plant.

MILWAUKEE—Eclipse Molded Products Co. has given general contract to Val Schramka for a one-story plant 30 x 100 feet. Oscar E. Knab is architect.

OSHKOSH, WIS.—Leach Co., logging and concrete machinery, will build a one-story addition. Elbert C. Leach is president.

PLATTEVILLE, WIS.—City, Jack

"KEEP THE BALL ROLLING" with...

Wapakoneta Knives

Solid Steel or Laid
properly tempered
and ground to suit
your most exacting
needs.

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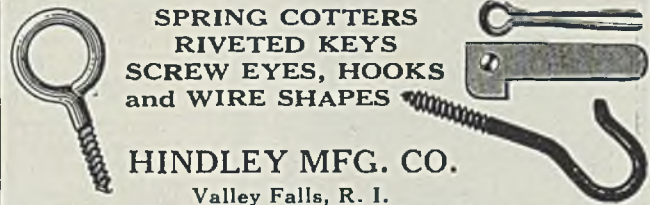
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Stephenson, clerk, is having plans prepared for additions and alterations to its sewage disposal plant. Kuehling & Jeffrey, Lancaster, Wis., are engineers.

PORT WASHINGTON, WIS.—Wisconsin Electric Power Co., 231 Michigan street, Milwaukee, will take bids soon on an addition to generating plant. Fred A. Lubber, Milwaukee, is architect.

SHEBOYGAN, WIS.—Sheboygan Foundry Co., gray iron castings, has given general contract to Arthur Hummitchsch for one-story foundry addition on Union avenue, Satre & Senescall are architects.

SPENCER, WIS.—Village, H. R. Hermonson, clerk, has applied for WPA funds to aid financing sewage disposal plant costing \$100,000 Frank J. Davy & Son, 502 Main street, La Crosse, Wis., is engineer.

WAUKESHA, WIS.—Hein-Werner Co.,

manufacturer of motor parts and hydraulic jacks, has given general contract to William F. Tubising for a one-story addition 30 x 80 feet.

WAUSAU, WIS.—D. J. Murray Mfg. Co., sawmill and papermill machinery, will build a one-story addition. Oppenhamer & Obel, Green Bay, Wis., are architects.

WEST ALLIS, WIS.—Universal Power Shovel Corp., power shovels and cranes, has given general contract to Klug & Smith Co., 111 East Wisconsin avenue Milwaukee, for one-story addition, 101 x 112 feet.

Minnesota

BARRETT, MINN.—Village, I. R. Olson, recorder, is taking bids on 50,000-gallon steel tank on 100-foot or 80-foot steel tower. G. M. Orr & Co., 542 Baker Arcade building, Minneapolis, are consulting engineers.

MINNEAPOLIS—Northern Pump Co., 920 Eighteenth avenue N. E., manufacturer of rotary pumps will expand plant by tripling foundry of its subsidiary, Northern Foundry Co., two additional 1000-foot buildings, and 800-foot material storage building.

Kansas

KANSAS CITY, KANS.—Board of public utilities, James D. Donovan, manager, plans addition to No. 2 power station at Quindaro, and installation of 30,000-kw generator, steam boiler, condenser and auxiliaries. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is engineer.

SCOTT CITY, KANS.—City, Harley Hoover, mayor, will start work about May 15 on sewage disposal plant to cost \$55,000 with WPA aid. Paulette & Wilson, Salida, Kans., are engineers.

TOPEKA, KANS.—Atchison, Topeka & Santa Fe railroad, H. W. Wagner, chief engineer, Topeka, will build a one-story 165 x 250-foot shop costing about \$150,000.

North Dakota

LISBON, N. DAK.—City, W. R. Sandager, auditor, holds special election soon on buying or building an electric light and power plant, not to exceed \$240,000 bond issue.

Nebraska

ASHLAND, NEBR.—City council has approved plans for WPA sewage disposal plant.

Iowa

CEDAR RAPIDS, IOWA—Iowa Electric Light & Power Co., Security building, will take bids soon for new power plant building 90 x 90 feet, 123 feet high and 200-foot stack. Contract for boiler has been given Springfield Boiler Co., 1901 East Capitol avenue, Springfield, Ill., Total cost of improvement will be about \$1,000,000.

LAMONI, IOWA—City will ask bids soon for diesel-engine generating unit and other equipment for municipal power plant, at cost of about \$47,000. A. S. Harrington, Baum building, Omaha, is consulting engineer.

MALLARD, IOWA—Special election will be held March 25 on \$30,000 bond issue to finance municipal light plant. K. R. Brown, 802 Valley Bank building, Des Moines, Iowa, is consulting engineer.

SIBLEY, IOWA—City, R. D. Stewart, clerk, plans sewage disposal plant, to cost about \$30,000. Maturity probably in June.

WATERLOO, IOWA—John Deere Trac-

tor Co. has given general contract for two-story 96 x 200-foot office building to J. G. Miller Construction Co., and for \$65,000 power plant addition to Jens Olsen Construction Co.

Colorado

CENTER, COLO.—Voters have approved proposal for power plant building, diesel-operated generator and distribution system, to cost about \$125,000. George S. Browne is city clerk.

Montana

LAUREL, MONT.—City, Roselle Fritz, clerk, is preparing plans for sewage disposal plant to cost about \$25,000. W. A. Good, Billings, Mont., is consulting engineer.

WHITEFISH, MONT.—City, Dan Auken, clerk, will hold special election in April on special bond issue to finance diesel-powered electric generating plant and distributing system to cost \$275,000. Henry L. Gray, Stuart building, Seattle, is consulting engineer.

California

CHULA VISTA, CALIF.—Rohr Aircraft Co., foot of G street, will build an addition of 147,000 square feet, costing \$275,000.

LOS ANGELES—Aluminum Co. of America will build die shop 100 x 160 feet, remelting building 40 x 100 feet and office building 40 x 80 feet at 5151 Alcoa avenue, costing about \$39,000.

LOS ANGELES—O. A. Pierson and J. Van Dalsen, 5338 Alhambra avenue, will build an addition to their machine shop, 25 x 90 feet, to cost about \$2500.

LOS ANGELES—Airtex Tool Co. has been organized by J. W. Boening, 6409 Avalon boulevard.

LOS ANGELES—Union Iron & Steel Co. has been organized by Arthur W. Lewis, 1620 North Indiana street.

SAN DIEGO, CALIF.—Solar Aircraft Co., 1212 West Juniper street, is building a corrugated metal storage building 22 x 154 feet, costing \$4000.

TORRANCE, CALIF.—International Derrick & Equipment Co. of California is building a galvanizing plant 41 x 144 feet at 2410 Carson street, costing about \$10,000.

VAN NUYS, CALIF.—Los Angeles department of water and power, 207 South Broadway, Los Angeles, will build substation at 4735 Cahuenga boulevard, 53 x 165 feet, to cost \$100,000.

Washington

SEATTLE—Northwest Steel Rolling Mills will build a plant addition 50 x 140 and 40 x 50 feet, general contract to Isaacson Iron Works, Seattle. Plans are by C. W. Cook, of the latter company.

Canada

BELLEVILLE, ONT.—Canadian National Railways will build frog repair shop, costing \$50,000, with equipment. General contract has been given to Wells & Gray Ltd., 17 Queen street East, Toronto.

SAULT STE. MARIE, ONT.—Algoma Steel Corp. Ltd., Wilde avenue, plans large addition to blooming mill department and other plant improvement. Sir James H. Dunn is president.

WINDSOR, ONT.—General Motors Corp. of Canada Ltd., William street East, Oshawa, Ont., will build plant additions here to cost \$250,000, with equipment. Plans are being drawn by Allward & Gouinlock, 27 Bloor street, West, Toronto, Ont.



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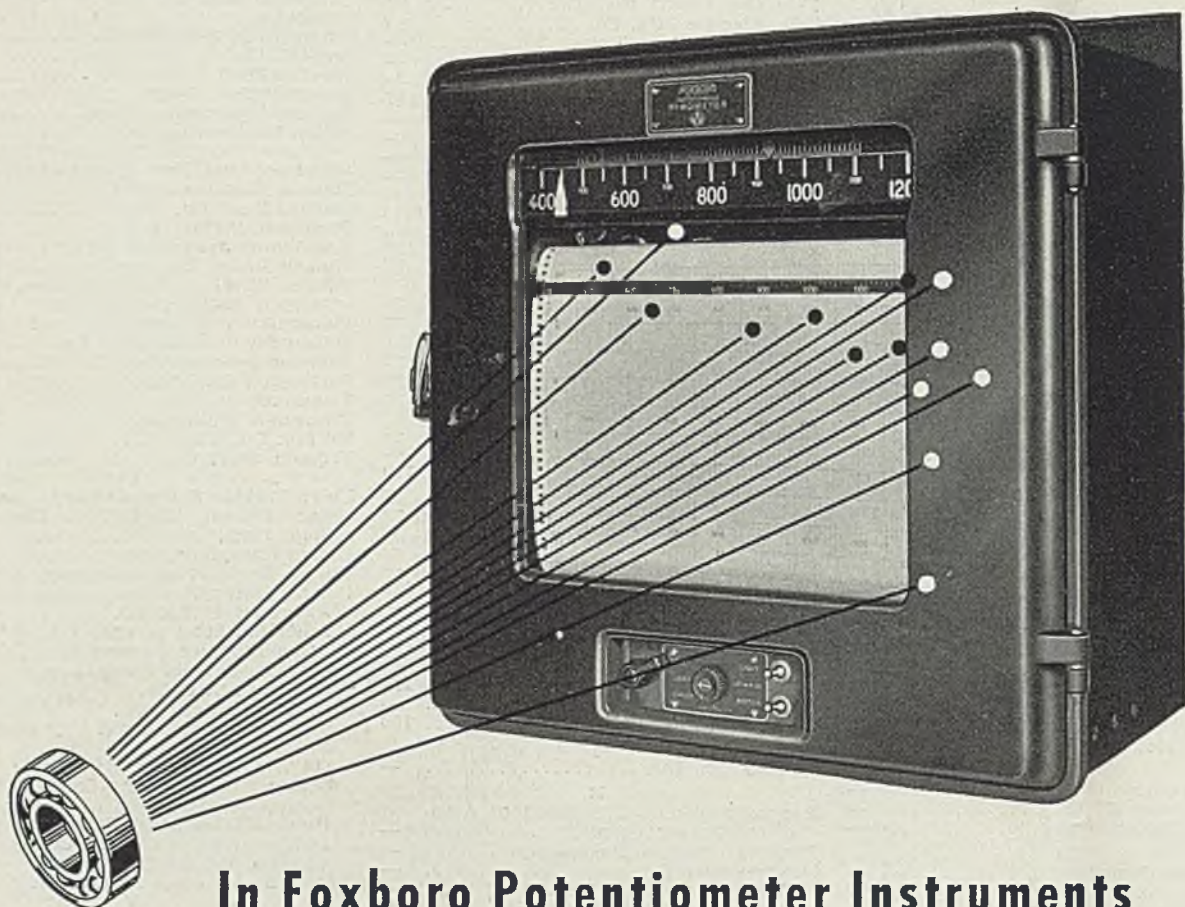
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